THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

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LONDON:—TRUBNER & CO., No. 60 PATERNOSTER ROW.

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Messrs. Herring & Co., New York:

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I had two of Herring's Safes in above fire. They saved my books, papers, and $2,000 *in bank bills*. C. L. WILCOX.

HERRING'S PATENT CHAMPION saved my books, papers, and about $400 in *paper money*. I would use no other. WILLIAM ROBERTS.

GREAT FIRE IN PEARL AND FULTON STS.

NEW YORK, Jan. 27, 1862.

Messrs. HERRING & Co., No. 251 Broadway:

Gentlemen,—The large HERRING'S PATENT CHAMPION SAFE you made for me a few years ago has been put to a severe test in the great fire corner Fulton and Pearl sts., on the 26th inst., which entirely destroyed my building, together with many others.

The fire commenced about 6 o'clock on Sunday morning, and the safe was taken from the ruins after an exposure of more than thirty hours.

Your Safe contained all my books, insurance policies, and other valuable papers besides, gold and silver, bank bills, coupon bonds, &c., amounting to over Two Hundred Thousand Dollars. Everything in the Safe is in perfect order, except the binding of the books being steamed.

Your Patent Champion Safe gives us great satisfaction, and has guarded safely through the fire every dollar of its contents.

Truly yours, A. S. FOSTER.

GREAT FIRE IN NEW JERSEY.

NEW BRUNSWICK, N. J., January 18th, 1862.

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No. 251 Broadway, New York:

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The heat in my store was very great, and the safe subject to an intense heat. I felt great interest in the safety of my papers, as a number of castings in my store and within a few feet of the safe were melted. Nothing, indeed, was saved in my building, except the contents of your safe, which I am happy to inform you was completely preserved, after a thorough roasting for some seventeen hours. The result has exceeded my anticipations, and fully confirmed my confidence in the security of your Herring's Patent Safe. Please send me another of larger size, and refer all incredulous to my books and papers, which it gives me great pleasure to show.

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WOODEN PURIFYING TRAYS.

WOODEN TRAYS FOR GAS-PURIFIERS.—The subscriber manufactures the WOODEN TRAYS for GAS-PURIFIERS on the invention of Wm. Combe, *cut from solid wood*, which are found superior to the iron plates formerly used, as being cheaper and more durable. The public are cautioned against the statements of R. G. Hunt, saying he has a patent for the seive itself, published in the AMERICAN GAS-LIGHT JOURNAL, as wholly without foundation. The following letter is from the Commissioner of Patents:

U. S. Patent Office, Jan. 6th, 1862.

Sir—In the matter of interference between the application of Hunt and Combe for patent conically slotted wooden gas-purifiers, appealed from the decision of the Examiner, the Examiners-in-Chief have rendered a decision, bearing date Jan. 4th, 1862. *The Examiners-in-Chief affirm the decision of the Examiner rejecting the first claim of Rich'd G. Hunt, and reverse the decision of the Examiner, rejecting the application of Wm. Combe, assigned to N. O. Hawxhurst.*

Unless an appeal shall be taken from this decision of the Examiners-in-Chief within the next ensuing thirty days, a patent will be allowed to N. O. Hawxhurst, assignee of Combe.

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(To be continued.)

CANADIAN PETROLEUM—ITS VALUE AND USES.

The following interesting article we take from the *Journal of the Board of Arts and Manufactures for Upper Canada*. The late discoveries of petroleum in Canada have already led to the investment of much capital in the business of raising and forwarding the oil, and it will, doubtless, become an important article of trade in that country. The *Journal* says:

The successful tapping of the great subterranean sources of petroleum in Enniskillen, has imparted a new and permanent interest to this extraordinary branch of industry and commercial enterprise. A great problem has been solved with respect to the sources of supply. Theoretically, the existence of deep-seated reservoirs of petroleum, occupying fissures and cavities in the rocks several hundred feet below the surface, has been predicted for some time past, but it was reserved for the energy and endurance of one or two individuals to prove their existence by actual and most successful experimental borings. Three "flowing wells" are now in operation, with a constancy and abundance of supply which surpasses the most sanguine expectations; and as yet we see but the beginning of these extraordinary fountains of oil, for there can be but little doubt that future borings in the vicinity of natural springs will reach the sources from which petroleum has been slowly oozing for centuries, perhaps for thousands of years, throughout the so-called oil region.

When the first petroleum spring was tapped at Titusville, Pennsylvania, in 1859, few persons conceived the vast importance of the discovery, or the astonishing commercial activity to which it would give rise in less than three years' time. In 1859, the Philadelphia and Erie railroad carried 325 barrels of petroleum; in 1860 the amount swelled to 21,794 barrels, and in 1861 the seemingly enormous number of 134,927 barrels were transported along that line alone. This large quantity is exclusive of the supplies conveyed by the Atlantic and Great Western railroad, and by the flat-boats, which float heavy cargoes to the Alleghany river, and thence to Pittsburgh. Large as these results appear to be, yet they fall into the shade when compared with the present yield, which in the Pennsylvania oil region is estimated at 75,000 barrels a month. No diminution has as yet been observed in the flowing wells; and so abundant and cheap is the yield from this source, that nearly all the pumping wells are now idle, and must probably continue so, unless the demand becomes greater than the flowing wells can supply at a very cheap rate.

The Canadian wells now rival those of Pennsylvania. The difficulty that the "oil men" have to contend with is to control the astonishing abundance of the yield, and to store it until a market can be found. The question of supply having been most satisfactorily solved, men are puzzled to know what to do with the treasure they have been so industriously seeking, now they have secured more than the most sanguine ever hoped for. The same energy and determination which sought and won it, must now be exerted to find a remunerative market for the unexpected and rather embarrassing abundance with which it has suddenly come upon them. The European markets alone are promising, and it is to Britain, France, and Germany that they must look for aid to help them out of their present dilemma.

The question naturally arises, to what uses can petroleum be applied? We propose to glance at some of the most important practical applications of this abundant natural product, and shall endeavor to show that its general introduction for many purposes in the arts, merely requires time for its properties to become widely known, and the certainty of an unfailing supply firmly established in the minds of those who will become our largest consumers.

Before proceeding to enumerate the different uses to which petroleum can be applied, let us examine the nature of those products which can be obtained from it by destructive distillation.

The following analysis of Canadian petroleum was made by that distinguished practical chemist, Dr. Sheridan Muspratt, who finds 100 parts of Enniskillen oil to yield, upon distillation,

Light-colored naphtha (S. G. .794).....	20
Heavy yellow naphtha (S. G. .837)	50
Lubricating oil, rich in paraffine.....	22
Tar.....	5
Charcoal.....	1
Loss.....	2
	100

The specific gravity of the crude oil is .835, the standard of specific gravity required in England for the best petroleum, being .830.

The light-colored naphtha is the benzole of the manufacturer. The heavy yellow naphtha is the illuminating oil.

The specific gravity of the Enniskillen oil is very nearly that of the standard. The Pennsylvania oil is considerably lighter, and does not yield so much illuminating oil on distillation. The Canadian oil contains considerably more paraffine than the American, as might be expected from its greater specific gravity. An idea of the comparative value of the Enniskillen petroleum may be obtained by comparing it with Young's patent paraffine oil, of which not less than 8,000,000 gallons are yearly manufactured, chiefly from the distillation of the Boghead coal. Canadian petroleum is twenty-five per cent. (25 p. c.) better adapted for illuminating purposes than the crude oil from the Boghead coal. The royalty on each gallon of Boghead coal oil, is 3d.; the price at which one gallon of the Enniskillen petroleum can be furnished, is 2½c., or about equal to the royalty on the Boghead coal-oil paid to Mr. Young for his patent, without the addition of the price of the coal, and all the expenses of the distillation of the oil. Under the disguised name of Belmontine oil, a vast quantity of petroleum illuminating oil is made in England from crude Burmese petroleum. It pays the enterprising proprietors of the Belmontine works to fetch from the far distant coast of Burmah, the crude petroleum of that country. Will it not richly pay them to fetch the crude petroleum of Enniskillen? No doubt if they knew of the supply, and believed in its constancy, they would gladly seize the opportunities presented to them.

ITS USE AS A BURNING FLUID.

The extraordinary cheapness of petroleum as an illuminator, is too well known in Canada to require any special notice. Notwithstanding the comparative dearness in this country and the United States of the chemicals (sulphuric acid and alkalies) which are required to purify, deodorize, and fit it for burning in lamps, yet it is, at 45c. a gallon, incomparably the cheapest illuminator which has yet been manufactured, and it threatens, for domestic purposes, to drive all other means of illumination out of the field. But in Britain, France, and Germany, where acid and alkalies are abundant and cheap, and where all the by-products —such as benzole, tar, &c.—can be utilized with profit, the preparation of purified petroleum can be effected at so much cheaper a rate than on this continent, as to nearly make up the difference in the cost of the raw material, which freight and insurance would add to it. We may then confidently look for the gradual introduction of petroleum as an illuminator throughout Britain, and a large part of the continent of Europe, in rural districts where gas is not accessible.

The distillation of bituminous shales for burning purposes, has long been practiced in France on a very extensive scale; as also the distillation of coal for the same object in the United States. Petroleum has arrested the production of coal-oil or kerosene on this continent; it will soon arrest, if proper steps are taken, the production of shale-oil in France and Germany. One ton of cannel coal produces from 50 to 100 gallons of crude-coal oil; the flowing wells in Enniskillen could yield, if they were allowed to pour fourth their contents *ad libitum*, as much oil in 24 hours, at a nominal cost, as the distillation of 1,000 tons of cannel coal could be made to produce. The production of the valley of Bear Creek, in the township of Enniskillen, is equal to 10,000 barrels a day if means of storage were in existence. In Northern Germany coal-oils are very largely used for street illumination, on the railroads and most exposed localities. They are largely manufactured in Hamburg; but if crude petroleum were laid down in that city, at the cost at which it can be supplied from the Canada wells, freight, insurance, and profit added, the manufacture of coal-oils would cease. In Saxony and in Prussia the same results would follow; in order to obtain a cheap illuminator, the bituminous shale-oil works so common in those countries, would be soon abandoned; for it must be borne in mind that such manufactures in Europe yield but small profits, even with all the skill and science of the German and French practical chemists. The poor shales are cheap, the coals dear, and it is of the utmost importance to notice that, if crude petroleum were imported, it would not occasion any material change in machinery, for the by-products are the chief sources of profit in Europe, all of which, in common with coal, petroleum is capable of producing. These products are—1st. Naphtha; used as a solvent for Caoutchouc, and different resins and gums. 2. Benzole; a valuable substitute for alcohol, ether, and turpentine, it dissolves fats, and is largely used in woolen, cotton, and silk manufactures; it restores faded colors; removes tar, paint, oils, grease, and resin, and is the source of numerous dyes. 3. Illuminating oil; respecting which nothing further need be said. 4. Heavy lubricating oils; which, when mixed with a certain proportion of other fatty materials, are much used in Europe. 5. Napthaline. 6. Tar, which, when mixed with a certain proportion of crude oil, is used for the manufacture of gas, or when mixed with saw-dust, as stated hereafter, for fuel. 7. Refuse carbon; suitable for fuel, as shown in the following paragraphs.

ITS USE IN THE MANUFACTURE OF GAS.

Where coal is abundant and cheap, it is not probable that in towns or cities, gas manufactured from petroleum will be a successful competitor for public favor, notwithstanding its superior illuminating power, and the agreeable softness of the light which it produces. The manufacture of gas from coal has attained such excellence, that where the material can be procured at six shillings sterling a ton, the value of the coke and other by-products is sufficient to pay all expenses, and many companies in England could afford to let their customers have their gas at a mere monimal price. But in districts where coal is dear, and in large buildings not within reach of gas-works, petroleum will become the cheapest source of illumination, and it has been satisfactorily shown in the city of Toronto, that it can be manufactured with the utmost ease, to burn without smoke or smell, and to give a light three times as brilliant as ordinary coal gas, and is capable of being produced at one-half the cost. One gallon of petroleum, converted into gas by the process adopted in the works of Mr. J. E. Thompson, of this city, produces more than 150 feet of gas, possessing a very high illuminating power, a soft and agreeable light, with perfect immunity from smoke or smell. One gallon of petroleum weighs 8 lbs. 6 oz., and produces from 150 to 200 cubic feet of gas—a proportion considerably greater than that obtained from coal, even of the richest and best quality. Hence, there is every reason to believe that the manufacture of gas from petroleum, will become general in large establishments, in rural districts, and in towns where coal is dear, not only in England, but more particularly in France, and many parts of Germany. In one town in Germany, they manufacture gas from the fat they extract from soap suds, which are daily purchased throughout the town. It is easy to conceive that the crude petroleum of Canada would soon arrest this ingenious and expensive process.

As before remarked, a large number of patents have been taken out in France for the manufacture of patent fuel, and there can be no doubt that a very valuable if not an inexhaustible market may be found in France for the crude petroleum of Canada, so admirably adapted to form the means of utilizing combustible products which, without admixture with tar or similar substances, are wholly valueless. No doubt the facilities now presented for procuring an abundant and cheap supply of petroleum, would make numerous other products servicable, which are at present lost as waste, or bereft of half their value for the want of a medium to render them capable of being utilized.

ITS USE AS A FUEL.

Few but those who have visited France, can form any idea of the high price of fuel in that country, or of the vast variety of methods which are employed to economize this necessary of life. Patents without number have been granted in France for the manufacture of "Artificial fuel." In order to explain this subject more thoroughly, we subjoin one or two of the processes which are largely employed not only in Europe, but also among the half civilized Orientals.

In the neighborhood of the Caspian Sea, where petroleum springs are abundant, the inhabitants manufacture a fuel by impregnating clay with the combustible fluid; the clods are afterwards burned on an ordinary hearth. The Norwegians have long economized the saw-dust of their mills, by incorporating it with a little clay and tar, and moulding it into the form of bricks. Of late years, in England, much attention has been given to artificial fuel in many districts, but not with much success, owing to the want of a suitable combustible, which petroleum is, above all others, best adapted to supply. In France, charcoal is prepared from the refuse of the charcoal furnaces, by mixing it with charred peat or spent tar, and then adding tar or pitch. The materials are ground together and subjected to heat in close vessels, to expel volatile gases. From seven to nine gallons of tar is mixed with two hundred weight of charcoal powder.

Gas used as fuel for culinary purposes, is daily becoming more common in Europe. It is easy to understand why this source of fuel should be preferred where civilization and luxury have converted mere comforts into actual necessaries of life, which are always secured, if money can purchase them. In rural districts, where common fuel is often very expensive, gas manufactured in portable works, would be largely used for culinary operations, as it now is where the supply of gas is

constant and cheap. But there is no necessity to convert petroleum into gas, in order to use it as fuel. Stoves have been constructed for the combustion of this substance without the use of a glass chimney, and without the production of smoke. It will necessarily, from its cheapness, supersede alcohol, which is commonly used as fuel for cooking purposes during the summer months. And we may soon look for its adoption as fuel for the generation of steam in our ocean steamers, where economy in bulk and weight, is so great a desideratum. Petroleum is, as it were, the essence of coal, and the question of its adoption as a steam generator, is dependent upon the abundance of the supply, to which a satisfactory answer has recently been given by the "flowing wells" of Enniskillen.

ITS USE AS AN ANTISEPTIC OR WOOD PRESERVER.

The cost of relaying the wooden ties and sleepers of railways is enormous. Our readers are familiar with Kyanizing, and similar processes. Wood steeped in petroleum, or, what is better, having petroleum forced into its pores by pressure, is proof against decay for many years.

ITS USE AS A LUBRICATOR.

Even the crude oil is sought for with eagerness for this purpose in many workshops in England, where swift motion is employed. When mixed with fat or resin, it acquires greater consistency, and it is more generally applicable to ordinary purposes, but it is the lubricating oil which is one of the results of the destructive distillation of the crude product that is and will be most extensively used. Even should the heavy lubricating oil be not used for the purpose its name implies, the paraffine can be extracted by cold and pressure, and candles made from it, so that, under all circumstances, there is no waste or loss.

Enough has been said to show that that the Enniskillen petroleum is admirably suited for many different purposes—as an illuminator, as a fuel, as material for the manufacture of gas, as a lubricator, an antiseptic, and to these may be added its use in the practice of medicine. We now turn to the difficulty and obstacles which oppose its introduction into the European market. At the beginning of this inquiry, we are staggered by the fact that the present charge on the Great Western Railroad of Canada, is, we are assured, three times as great for petroleum as for cattle. A car load of 55 barrels of oil from Wyoming to Toronto costs $75—a car load of cattle from Windsor to the Suspension Bridge, costs $25, or ONE-THIRD the freight of the oil. It is of the highest importance that a reduction in freight should take place, or that a tramway from the springs to Lake St. Clair, be constructed without delay. If it should be found advisable to make Toronto the port of discharge, and thus escape the delays of the Welland Canal, and cost of transport to Lake St. Clair, railroad freight must come down, or it will be the interest of the "oil men" to make Lake St. Clair their point of departure for Europe.

It is of the highest importance that information respecting the nature and extent of the supply in Enniskillen, should be widely distributed not only in England, but in France and Northern Germany. Practical illustrations must be afforded the public in Europe, that Canadian petroleum can do all that is promised for it. No better opportunity than the present could offer itself for effecting this object. A display of its properties, say in the manufacture of gas as being the most important, at the Great International Exhibition held at London the present year, would prove infinitely more valuable in making it generally known, than any number of advertisements. We are assured that it is the desire of the Canadian Commissioners that the Canadian Department at the International Exhibition, should be illuminated with gas manufactured from Enniskillen petroleum, and Mr. J. E. Thomson, of Toronto, will send one of his portable petroleum gas retorts, with purifiers and gasometers complete, for this purpose. The Canadian Commissioners could not have devised a better plan for directing public attention in England and elsewhere, to this new and remarkable source of wealth to Canada. The illumination of the Canadian department by this means, will be attended with considerable expense, and if it should be beyond the limited resources of the Commissioners, no doubt the public spirit of private individuals will not be wanting in providing the necessary funds. Practical men like to see and judge for themselves. They receive with many doubts any statements which may be made without practical demonstration. Make petroleum gas before the practical men of Britain, and they will believe their own eyes; tell them all that is true about it, without illustration, and they will turn the cold shoulder to statements not accompanied by practical results.

Some idea of the enormous interests at stake in the manufacture of illuminating oils from coal, shale, and Burmese petroleum in Britain, may be formed from the announcement made in evidence at a late trial, that during the year 1861, not less than 350,000 lamps for burning fluid, were made by one firm alone. Paraffine oil, amongst other fluids, is sold at 3s. stg. a gallon, to burn in these lamps, and if we assume that gas can be produced at 5s. per thousand, the cost of the light from the paraffine oil is 20 per cent. dearer than that of gas. But suppose that Canadian petroleum could be laid down in England at 12d. sterling, or 25 cents a gallon, petroleum light would be far cheaper than gas, the least expensive illuminator in England. Is not this universal field for enterprise a sufficient inducement for the "oil men" of Enniskillen to put their shoulders to the wheel, and open for themselves a boundless market in England, France, and Northern Germany? Sir Roderick Murchison, in his address on the progress of Geology, recently delivered at Manchester, before the British Association, called attention to the "*important discovery of a resinous shale* in Tasmania, termed dysodile, which, like the torbane mineral of Scotland, promises to be turned *to great account in the production of paraffine.*" We have the paraffine ready formed and associated with rich illuminating oils and other substances in our Canadian petroleum, which shows only two parts of waste in every hundred part by weight. Scottish Torbane mineral, Australian Dysodile, French bituminous shales, German lignites, and Brown coal, Cuba and Porto Rico asphaltum must all give way before Canadian petroleum; how soon! depends upon the spirit, activity, and energy, of the Enniskillen "oil men." The markets of England, France, and Germany, are open to them, if they will take steps to make their "treasures of oil" widely, thoroughly, and truthfully known, to the manufacturers of Europe.

ON COLORING MATTERS DERIVED FROM COAL TAR.

BY W. H. PERKIN, ESQ.

(*From the Quarterly Journal of the Chemical Society.*)

(Continued from page 299.)

FUCHSINE OR MAGENTA.

This beautiful product, which is often improperly called roseine, is a member of an entirely different series of compounds to the foregoing, being formed under very different circumstances, and possessing very different properties. It was first observed by Natanson, in 1856, when studying the action of chloride of ethylene on aniline, and afterwards (shortly before it was practically introduced into the arts), by Dr. Hofmann, when preparing cyantriphenyl-diamine by the action of bichloride of carbon on aniline. It was M. Verguin who first brought it forward as a dyeing agent, and who, I believe, taught manufacturers how to prepare it on the large scale.

Fuchsine is invariably formed at a temperature ranging from 170° to 190° C. It is produced from aniline, by the action of reducible chlorinized, brominized, iodized, or fluorized substances, as well as by weak oxidizing agents. The substances generally used for its preparation on the large scale, are the perchlorides of tin and of mercury, and the nitrates of mercury.

Preparation of Fuchsine by the action of Bichloride of Tin on Aniline.—Aniline combines with bichloride of tin, evidently producing a double compound; this product is a whitish substance, and may be prepared by adding to aniline bichloride of tin in the anhydrous state, or dissolved in water. Anhydrous bichloride of tin combines with aniline with great energy to form this compound.

To prepare fuchsine from the double compound, it is necessary that it should be free from water, or nearly so: hence anhydrous bichloride of tin is generally employed for its preparation. The process adopted is as follows: Anhydrous chloride of tin is slowly added to an excess of aniline, the mixture being constantly stirred, and the pasty mass thus formed gradually heated. As the temperature increases, it becomes quite liquid, and also brown in color. As soon as the temperature nearly approaches the boiling point of the mixture, it rapidly changes to a black-looking liquid, which, when viewed in thin layers, presents a rich crimson color. This is kept at its boiling point some time, and then well boiled with a large quantity of water; by this means, the principal part of the coloring matter is extracted, together with considerable quantities of hydrochlorate of aniline. The residue is a solid, of a brown color, and contains considerable quantities of tin in the form of a proto-compound.

The aqueous solution of the coloring matter and hydrochlorate of aniline is then boiled, so as to volatilize any free aniline it may contain, and then saturated with chloride of sodium. The chloride of sodium causes the coloring matter to separate as a semi-solid pitchy substance, of a golden-green aspect, while the hydrochlorate of aniline remains in solution. The coloring matter thus obtained may be further purified by digestion with benzole, which dissolves out a certain amount of resinous matter.

Preparation of Fuchsine by the action of Mercurous Nitrate on Aniline.—When mercurous nitrate is left in contact with aniline for some time, it forms a white pasty mass, but when carefully heated to 170° C. or 180° C., it reacts upon it, forming a brown liquid, which gradually changes to a dark crimson; at the same time the whole of the metal of the mercury-salt collects at the bottom of the vessel. This product, when separated from the metallic mercury, and allowed to cool, becomes semi-solid, being filled with crystals of nitrate of aniline.

To purify this product, it is best to dissolve out the nitrate of aniline it contains in a small quantity of cold water, and then to boil the remaining product several times with fresh quantities of water, until the principal portion of the coloring is extracted, and filtering the resulting aqueous solutions while hot. On cooling, these solutions deposit the coloring matter as a golden-green tarry substance, from which benzole separates a small quantity of brown impurity, leaving the coloring matter as a brittle solid.

I have briefly described the above processes, because they may, to some extent, be regarded as types of most of the methods employed for the production of this coloring matter, the first representing its formation by the action of reducible chlorides upon aniline, and the latter, by the influence of weak oxidizing agents upon aniline.

Fuchsine is undoubtedly an organic base, and a more powerful one than is generally supposed. The product obtained from aniline by means of bichloride of tin, is the hydrochlorate of fuchsine, and that obtained by the oxidizing action of nitrate of mercury is the nitrate of fuchsine.

Fuchsine is separated from its salts by precipitation with a small quantity of ammonia.

When freshly precipitated, it is a red, bulky paste, which, on drying, contracts to a purplish red powder. It is but sparingly soluble in water, though moderately soluble in alcohol; it is insoluble in ether and hydrocarbons. A small quantity of hydrochloric acid causes it to dissolve freely in hot water, but an excess of either hydrochloric or sulphuric acid dissolves it, forming a brownish yellow liquid, from which ammonia separates it unchanged; by this reaction it may be distinguished from roseine, which dissolves in strong sulphuric acid, producing the green liquid previously mentioned. Caustic alkalies, or ammonia in excess, partially precipitate fuchsine from its salts, but at the same time, dissolve a considerable quantity of it, forming nearly colorless liquids. Acetic acid added to these alkaline solutions restores the color of the fuchsine, and if the liquids are concentrated, this base precipitates as a red floculent substance.

An alcoholic solution of fuchsine, when evaporated to dryness, leaves the coloring matter as a brittle mass, having a remarkably beautiful golden-green metallic reflection.

M. Béchamp has analyzed carefully prepared specimens of fuchsine, and found it to have the formula: $C_{12}H_{12}N_2O$, the hydrochlorate being $C_{12}H_{12}N_2O$,

HCl, and the hydrochloroplatinate, which is a purple precipitate, having the formula $C_{12}H_{12}N_2O,HPtCl_3$.

The existence of oxygen in this base is remarkable; because, in many instances, it is produced from agents which do not contain a trace of oxygen; as for example, bichloride of tin and aniline. The presence of oxygen in the product analyzed, leads to the idea that it was a hydrate; thus:

$$\underbrace{C_{12}H_{12}N_2O}_{\text{Béchamp fuchsine.}} = \underbrace{C_{12}H_{10}N_2}_{\text{Anhydrous fuchsine.}} + H_2O$$

This is perhaps, to some extent, confirmed by the fact that iodaniline when heated yields fuschine:

$$\underbrace{2\,[C_6(H_6I)N]}_{\text{Iodaniline.}} = \underbrace{C_{12}H_{10}N}_{\text{Anhydrous fuchsine.}} + 2HI$$

But supposing the fuchsine examined by M. Béchamp, to have been a hydrate, it is remarkable that its hydrochlorate, and more particularly its hydrochloroplatinate, should also be hydrates. But, as our knowledge of this body is as yet but scanty, we must wait for the accumulation of facts before we can form any fixed opinion respecting its constitution.

The compounds investigated by M. Béchamp appear to be uncrystalizable. Sometime back I had upwards of a hundred gallons of a hot aqueous solution of this coloring matter, which had been prepared by means of nitrate of mercury. This solution, on standing until cold, deposited a considerable quantity of the coloring matter in the form of small octahedrons, having a most beautiful green metallic reflection.

Reducing agents decolorize fuchsine; but the oxygen of the atmosphere restores it to its original tint. If an alcoholic solution of fuchsine be left in contact with sulphide of ammonium until decolorized (or nearly so), and then exposed to the atmosphere, its color is immediately restored; but if it be left to stand for several days, and then subjected to the atmosphere, several hours elapse before it assumes its original color. Like aniline purple, fuchsine is a very intense coloring matter.

Tannin precipitates both fuchsine and its salts, forming difficultly soluble substances; bichloride of mercury also precipitates this base and its salts, forming double compounds.

When fuchsine is prepared by means of bichloride of tin, and more particularly when nitrate of mercury is used, there are two other coloring matters produced—one possessing an orange and the other a purple color. It is on account of the presence of the former that some samples of commercial fuchsine possess a scarlet hue. Of this orange coloring matter scarcely anything is known. It is not precipitated from its solutions by alkalies. Of the purple coloring matter also but little is known. It is formed at the same time as fuchsine, but in very small quantity, and is difficult to separate perfectly. Its properties are similar to those of fuchsine. It dissolves in concentrated sulphuric acid, forming a reddish brown solution, from which part of the coloring matter is separated by dilution with water. Hydrochloric acid dissolves it, forming a dirty yellowish-red liquid.

BLEU DE PARIS.

This is yet another coloring matter, produced under circumstances similar to those which give rise to fuchsine. MM. Persoz, V. de Luynes, and Salvétat give the following account of its preparation and properties:

Nine grammes of anhydrous bichloride of tin and sixteen grammes of aniline, heated for thirty hours to a temperature of about 180° C., in a sealed tube, produce neither a red nor a violet, but a very pure and lively blue. This blue, which resists acids, is darkened in color by alkalies; but passes to a groselle violet when submitted to this agent in a concentrated state. It preserves its beauty of color by artificial light, and it dyes animal fibres of a shade whose beauty leaves nothing to be desired.

This coloring matter crystallizes from its alcoholic solutions in fine needles, having an aspect similar to that of ammoniacal sulphate of copper. It is soluble in water, alcohol, wood-spirit, and acetic acid, but insoluble in ether and bisulphide of carbon. With concentrated sulphuric acid it forms an amber-colored solution, which water converts into a magnificent blue liquid. Strong nitric acid decomposes it. Chromic acid precipitates it from its aqueous solutions without decomposition. Chlorine destroys it. Sulphurous acid does not decolorize it. I find that sulphide of ammonium is also without action upon it. It is precipitated from its aqueous solutions by alkalies and saline compounds.

ANILINE-GREEN OR EMERALDINE.

Most chemists who have worked with aniline in the laboratory, must have noticed the peculiar green substance which forms on the outside of the various pieces of chemical apparatus which have been standing in the vicinity of any quantity of this body; this product is aniline-green.

Aniline-green has been known for several years. It may be formed by various processes. One process consists in oxidizing aniline with chloric acid. This is effected by mixing a hydrochloric solution of aniline with chlorate of potassium. It may also be obtained by oxidizing a salt of aniline with ferric chloride. Obtained by either of these processes, it presents itself as a dull green precipitate, which, when dried, assumes an olive green color. It is insoluble in water, alcohol, ether, and benzole. Sulphuric acid dissolves it, forming a dirty purple-colored solution, from which it is precipitated unchanged by water. With alkaline solutions it assumes a deep color, somewhat similar to indigo; but acids restore it to its original tint. The color of aniline-green is much enlivened by the presence of an excess of acid; but, unfortunately, as soon as this acid is removed, it passes back to its normal color.

Toluidine, xylidine, and cumidine, yield coloring matters under the influence of oxidizing agents, and also when submitted to the action of reducible chlorides at high temperatures, analogous to those obtained from aniline under similar circumstances; but the results are generally not so good, the color of the products becoming tinged with brown as the bases get higher in the series.

NITROSOPHENYLINE.

This remarkable body is obtained by the action of nascent hydrogen on an alcoholic solution of dinitrobenzole. It is represented by the formula $C_6H_6N_2O$. It is almost insoluble in water, but soluble in acids and in alcohol, producing crimson-colored solutions; but its color is not nearly so brilliant as that of fuchsine. It seems gradually to decompose when kept. I have not tried any experiments with it as regards its dyeing properties.

DINITRANILINE.

Dinitraniline is obtained by decomposing dinitrophenyl-citraconimide with carbonate of sodium. When pure it crystallizes in yellow tables. It dissolves very sparingly in water, producing a yellow liquid. It has the formula

$$C_6H_5(NO_2)_2N.$$

It does not combine with acids or alkalies, although it appears to be more soluble in acidulated than in pure water.

Silk can be dyed yellow with dinitraniline.

NITROPHENYLENE-DIAMINE, OR NITRAZOPHENYLAMINE.

Dinitraniline, when submitted to the action of sulphide of ammonium, changes into this beautiful base, which crystallizes in red needles, somewhat similar in appearance to chromic acid. It dissolves in water, forming a yellow or orange-colored solution, like that of bichromate of potassium. Alcohol and ether dissolve it freely. It is not at all like fuchsine in its properties, as it forms salts of a yellowish brown or grey color, whereas, fuchsine forms crimson salts.

This base possesses the power of dyeing silk a very clear golden yellow color.

PICRIC, OR TRINITROPHENIC ACID.

This beautiful acid was discovered by Hausmann as early as 1788. It may be obtained by the action of heated nitric acid upon a great variety of substances. The following are the names of some of them: indigo, aniline, carbolic acid, saligenine, salicylous and salicylic acids, salicine, phlorizin, cumarin, silk, aloes, and various gum-resins. It is now prepared for commercial purposes from carbolic acid, and also from certain gum-resins.

I have successfully prepared it from carbolic acid on the large scale in the following manner: As strong nitric acid acts very violently when brought in contact with carbolic acid, I have found it best to use an acid having a gravity below 1.3, so as partially to convert the carbolic acid, and afterwards to boil it in stronger acid to change it into picric acid. On diluting the acid solution, the impure picric acid precipitates. To purify this further, it should be crystallized from boiling water.

When preparing this product for commercial purposes, it is advantageous to let all the nitrous fumes formed in its preparation, together with a certain amount of atmospheric air, pass over a fresh quantity of carbolic acid: this will absorb them, and, at the same time, be converted into nitro- or dinitro-phenic acid, and consequently diminish the quantity of nitric acid required for its manufacture.

In the preparation of picric acid from carbolic acid there is always a quantity of a yellow resinous matter produced, and at times a considerable quantity of oxalic acid. The latter is always produced when the acid which is used to finally convert the carbolic acid, is too weak: for then it rapidly decomposes the picric acid, yielding carbonic and oxalic acids.

Picric acid was introduced as a yellow dye about five or six years since by Messrs. Guinon, Marnas, and Bonney, eminent silk-dyers, of Lyons. Many of the cheap products sold of picric acid are of a brown color, and consist of impure di- and tri-nitrophenic acids, and sometimes of this crude product and ground turmeric.

ROSOLIC ACID.

Runge first noticed this substance in 1834, when studying creosote; but it was almost lost sight of, until again observed by Dr. Hugo Müller, only a short time since. He accidentally observed that when crude phenate of calcium is exposed to a moist heated atmosphere, as that of an ordinary drying stove, it gradually changes in color, and assumes a dark red tint. This coloration is due to the formation of rosolate of calcium. (I have lately heard that phenate of sodium undergoes a similar change.) Dr. Müller's mode of preparing rosolic acid from this product, and his description of its properties, are given in his paper published in this Journal, vol. xi., p. 1; it is therefore unnecessary to repeat them.*

Mr. Duppa and myself, when investigating some of the derivatives of acetic acid, found that when phenic acid and bromacetic acid were heated together at 120° C., two products were formed, one possessing all the properties of rosolic acid, while the other had the character of brunolic acid. We also found that a mixture of iodine and carbolic acid, when heated with formic, acetic, butyric, or valerianic acids, produced rosolic acid or a similar substance. A mixture of carbolic acid and iodine did not give a similar result, but a black solid containing iodine.

Rosolic acid has lately been prepared on the large scale, and employed for the purpose of printing muslins. I believe it was the rosolate of magnesium that was employed for this purpose. I do not think it is now used, having been replaced by the more beautiful coloring matter, fuchsine. It was fixed by means of albumin.

COLORING MATTERS OF QUINOLINE OR CHINOLINE.

Chinoline is found associated with lepidine, cryptidine, and other of the higher nitrile-bases in the basic oils obtained from coal tar, and also in the products obtained by distilling cinchonine with caustic alkalies. It was previously termed *leucoline* or *quinoline*, but the substance described under these two names was found to contain three or more distinct bases. These have been studied by C. Greville Williams, who has applied the name *chinoline* to the product which forms the principal part of the impure substance originally termed quinoline. The substance used for the production of coloring matters need not be pure chinoline, as the product originally termed quinoline is of sufficient purity for this purpose.

Cinchonine appears to be the best source of chinoline, yielding, when distilled with excess of caustic alkali, 65 per cent. of this body sufficiently pure for manufacturing purposes.

Chinoline yields three coloring matters—a violet, a blue, and a green. The following is an account of their preparation by Greville Williams:

In order to procure the blue color, one part, by weight, of chinoline is to be boiled for ten minutes with one and a half parts of iodide of amyl. The mixture

* See also Tschelnitz (J. pr. Chem. lxxi., 416; and R. Angus Smith, Phil. Mag. (4) xiii., 45; Jahresbericht d. Chem., 1857, p. 447.

from being straw-colored becomes deep reddish brown, and solidifies on cooling to a mass of crystals. This product of the reaction is to be boiled for ten minutes with about six parts of water, and, when dissolved, filtered through paper. The filtered liquid is to be gently boiled in an enamelled iron pan over a small fire, and excess of ammonia gradually added. The ebullition may be prolonged with advantage for one hour, the evaporation of the liquid being compensated for by the gradual addition of weak solution of ammonia. The latter may be prepared by the admixture of equal volumes of ammonia of density 0.880 and distilled water. The hour having elapsed, the whole is allowed to cool, when the color will almost entirely have precipitated, leaving the supernatant liquid nearly colorless. On pouring the fluid away (preferably through a filter, in order to retain floating particles of color) the dish will be found to contain resinous looking masses which dissolve readily in alcohol, yielding a rich purplish-blue solution which may be filtered and kept for use.

The color prepared as above is, as has been said, of a purplish tint, but if a purer blue be required, the following modification is to be resorted to. The filtered aqueous solution of hydriodate of amyl chinoline is, as before, to be brought to the boiling temperature, but instead of adding ammonia, a solution of caustic potash, containing about one-fifth of its weight of solid potash, is to be substituted. The addition is to be continued at intervals until three-fourths as much potash has been added as is equivalent to the iodine in the iodide of amyle used. The fluid may, after a quarter of an hour's ebullition, be filtered to separate the resinous color. The product is a gorgeous blue with scarcely any shade of red. On adding the other fourth of potash to the filtrate while gently boiling, a black mass will be precipitated containing all the red, which otherwise would have been mixed with the blue. This mass dissolves readily in alcohol, yielding a rich purple solution, containing, however, an excess of red. The alcoholic solution on filtration leaves on the filter a dark mass soluble in benzole, and, as sometimes prepared, affording a brilliant emerald-green solution of great beauty. It is not always easy to obtain this green color.

The properties of chinoline-violet and chinoline-blue are, as far as I have been able to ascertain, identical. They are resinous substances which present a coppery appearance by reflected light, but when in very thin layers, appear of a violet or blue color by transmitted light. They are bases, and dissolve in acids, forming pale red solutions, which ammonia restores to their original colors. They are slightly soluble in hot water. Tannin precipitates them from their aqueous solutions, apparently forming an insoluble compound. Reducing agents do not affect their shade of color.

Chinoline green is described by Grevillo Williams as having a brilliant emerald-green color of great beauty. I have observed that when chlorine is passed through an alcoholic solution of chinoline blue, it changes into a green; but whether this is the green spoken of by Williams, I am unable to state.

(*To be concluded.*)

IS GAS-LIGHTING DANGEROUS?

By J. O N. Rutter.

(*From the Journal of Gas-Lighting.*)

Some subjects—topics only of common conversation—it is the wisest and safest course to let alone. They soon wear themselves out, and are forgotton. Others which, in various ways, are kept before the public, may not in reality be of much importance, and yet ought not to be permitted to pass unnoticed. These things which are least understood, almost always create the strongest prejudices; and, as long as ignorance remains, the prejudices are perpetuated. It seems as if some of these prejudices would never die out. From time to time they are revived, repeated, and republished with all the gravity and oraculousness of new discoveries. After making large allowances for defective information, for official bias, and for, probably, something akin to disinclination to examine all sides of a question, I cannot but think it unfair, so unfair as to amount to injustice, for any one to talk, and write, authoritatively about gas-lighting being dangerous.

Of all classes of statistics, those professing to explain the causes of the fires which annually occur in the metropolis, are the least satisfactory. No doubt great care is exercised in collecting information, and all that can be done is done in trying to get at the truth. Let it be remembered, however, that for years past it has been the practice to ascribe to "gas," the principal part of the unexplained fires, and so it has had to bear a vast deal more than justly belonged to it. Whatever may be the proportion of fires actually chargeable to the use of gas, those which are accidental, or, in a certain sense, unavoidable, ought to be distinguished from those occasioned by wilful carelessness, and culpable negligence. In the latter cases, the persons who have misused or misapplied the gas have been "dangerous," not the gas itself.

All kinds of combustible materials are dangerous. Fire in its various forms, without flame and with flame, and whether employed for heating or lighting, is dangerous. Open fire-places, enclosed stoves, heating by air and water, ovens and furnaces, gas-lights, lamps, candles, and lucifer matches, are dangerous. Who, in his right senses, will deny this? But, with so many dangerous materials, and dangerous processes, about us, the world has gone on; and the accidents, costly and calamitous as some of them have been, are, comparatively, few in number.

In the use of heating and light-giving materials, and in their application to the innumerable processes of trade, manufactures, and social life, what is it which constitutes immunity from accidents? Is it not because some of the materials are more easily managed than others? In themselves they are as dangerous, but, in their application, the elements of safety greatly outnumber those of danger. In actual every-day practice, it is next to an impossibility to derange or interrupt the successful operations of some kinds of combustible materials; whilst others are at any moment liable to go wrong, and, with the most attentive supervision, they often do go wrong.

In helping to promote the use of gas, the question uppermost in my thoughts, during thirty years, has been, not whether gas is dangerous, but whether, in its right application, it is attended with fewer risks of accident, than any other material? This question has long been settled. I believe it to be impossible to over-estimate the benefits of gas, when comparing, or rather contrasting, it with other light-giving materials, and solely on the principle of safety. If all the ordinary kinds of light-giving substances are more or less dangerous, is it not reasonable, as well as desirable, to make a selection? This has been done. The public—manufacturing, commercial, social—have declared in favor of gas; and, to an extent which probably will never be, even approximately, represented by figures. What avails it to try to resuscitate old-fashioned and obsolete prejudices? Who will listen to them, or who will believe in them?

Gas-lighting must not be looked at hastily, nor only in its commonest and most familiar aspect, if we would come to a right conclusion as to its superiority in respect to safety. A good-sized well-lighted shop, or warehouse, or manufactory, or printing office, or private dwelling, is an example of the advantages of gas, under favorable conditions. In passing along the streets, the thousands of burners of various forms and sizes, which are seen so closely mixed up with fragile and combustible materials, may seem to convey a notion of danger. But it is not so. Accidents from such causes are extremely rare. Practice and experience may be relied on. The risks are smaller than they appear to be.

Those who wish to magnify, or, as I ought to say, exaggerate, the dangers of gas-lighting, should dive below the levels of the streets, and witness what is going on in vaults and cellars, kitchens and workshops, packing-rooms, and warehouses; where the floors are strewed with paper, straw, and shavings, and every available space filled with bales, boxes, and casks; whose contents, in many instances, are as inflammable, and a hundred times as dangerous, as the gas which illuminates them. Then, it may be well to remember the class of persons to whose care and management gas-lights are intrusted; and what a continuous stream of young and inexperienced persons is daily flowing towards the metropolis, and all the large cities and towns in the kingdom. Many of these have, in a few days, and sometimes in a few hours, to take care of their masters' and mistresses' property, and to light and put out the gas, although they may never have done so before.

If further proof be needed that gas-lighting is not dangerous, let us think of the piles of buildings in the manufacturing districts, and the processes carried on in them; where the number of burners and the gas consumed in one of them are equal to what are required in a moderate-sized town. We may also try to think of the probable number of burners, the thousands of millions of cubic feet of gas, and the quantity of light obtained from it; and then we may ask where the tallow, or oil, or other materials are to be obtained to supply its place, with light so pure, so healthful, so cheap, and so free from danger?

Black Rock, Brighton, Feb. 17, 1862.

Loyalty of Gas Employees.—The Richmond *Enquirer* says: We learn that nine of the men employed at the city gas-works utterly refused to take the oath of allegiance (*i. e.* to the rebel government), saying that they had sworn to support the constitution of the United States, and would not perjure themselves. Richmond will no doubt be made too hot to hold these Yankee sympathizers.

We wish we had the names of these honorable men. They deserve to be held in grateful remembrance by all loyal citizens. If they should be driven away from their homes by the minions of Jeff. Davis, we hope their fellow craftsmen of the North will see that they do not suffer privation.

Cost of Exporting Petroleum.—An interesting article in the Toronto *Globe* gives the cost of exporting Canadian petroleum, per barrel, as follows:

Cost of barrel	$2 00
Freight from well to Wyoming	50
" " Wyoming to Toronto	1 00
" " Toronto to Liverpool	3 20–$6 70

Let us compare it with the cost fron Oil Creek:

Cost of barrel	$2 00
Teaming to the Junction, (average)	1 50
Forwarding	04
Freight to New York	1 91
Forwarding and charges at New York	25
Freight to Liverpool	2 00–$7 70

Via Pittsburg and Philadelphia the figures are a little better:

Cost of barrel	$2 00
Freight from wells to Pittsburg	80
" " Pittsburg to Philadelphia	1 30
Forwarding and charges at "	25
Freight to Liverpool	2 00–$6 35

A Long Journey.—The London *Builder*, evidently believing some of the oil well stories rather fishy, thus facetiously refers to a deep well now being sunk on Oil Creek: We are told from America, that there is a well in Oil Creek which has attained a depth of 875 feet, and yet yields no oil. The proprietors seem determined not to give it up, however, and are boring away as hard as ever. They have written on their derrick, "to oil, or China," and the people thereabout think they have a longish journey before them.

Philadelphia, Pa.—In the Philadelphia Councils, the Committee on Water, recently awarded the contract for supplying the department with water-pipe, to Messrs. Trainer & Mercer, of Philadelphia, at the following rates:—

3	inch pipe at	18½	cents	per foot.
4	"	29	"	"
6	"	48	"	"
8	"	65	"	"
10	"	76	"	"
12	"	85	"	"

Washington, D. C.—An opposition gas company has been formed at the national capital. The authorized subscriptions to be of $500,000, of which $300,000 is said to have been taken, and the works will be commenced as soon as the charter is obtained from Congress, which is daily expected. The price of gas to be $2 per 1,000 feet. Messrs. J. W. Thompson & Co., the extensive gas-fitters of that city, are largely interested and prominent movers in the enterprise.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

LIGHT, HEAT, WATER-SUPPLY AND SEWERAGE.

Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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THE
AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

PROPRIETOR, JOHN B. MURRAY. | EDITOR, C. ELTON BUCK.

TUESDAY, APRIL 15, 1862.

The attention of Congress during the past few weeks has been particularly directed to perfecting the tax bill, and in providing an equitable method of raising a revenue sufficient for securing the interest on our rapidly accumulating national debt. Legislation of this nature is a new thing in the United States, where national taxes have heretofore been almost unknown, and partly on this account, and partly from a desire to introduce a system which shall be at once thorough and complete, the action of the House committee whose duty it is to report the bill, must be necessarily slow. The amount of labor in framing a provision, the result of which is of such paramount importance, is truly prodigious. The necessity of being conversant with the various interests upon which burdens must be imposed, entails a vast amount of study and preparation on the part of the committee. Even after the first draft of the proposed enactment is made, the work is scarcely half done, for a measure affecting such large and varied interests cannot possibly be drawn to please all, and the most troublesome work of the committee has been in hearing remonstrances against certain of its provisions, with suggestions of alterations in others,—a task enough to try the patience and endurance of the most forbearing of men. The gentlemen of the committee have already experienced this annoyance, and deputations from all parts of the coountry have been pouring in upon them, each with some favorite alteration to recommend, or some substitute to propose. The nation awaits with anxious feelings the final report of the House and the people are desirous of seeing the bill completed and its provisions enforced.

On page 280 of this volume, we made some remarks upon the proposed tax on gas, and suggested that the figures named in the first draft of the bill were not of an entirely equitable nature, as they would fall with undue severity upon weak companies, some of which would hardly have been able to sustain themselves had the bill passed as originally proposed. It will be remembered that the first proposition was to impose a tax of twenty-five cents per thousand cubic feet, irrespective of the proportional amount made. We are pleased to observe that a wiser discrimination has been made since then, and the bill as it now reads provides that when the manufacturer of illuminating gas shall not produce above 500,000 cubic feet per month he shall pay a tax of five cents for each thousand cubic feet; when he manufactures above 500,000 cubic feet, and not exceeding 5,000,000 cubic feet, he shall pay a tax of ten cents on each thousand cubic feet; when he manufactures above this, and not exceeding 15,000,000 of cubic feet, he shall pay fifteen cents for each thousand cubic feet, and that when he manufactures over 15,000,000 cubic feet he shall pay a tax of twenty cents per thousand cubic feet. Gas companies are authorized to add the duty or tax to their charges, any limitation of any State law to the contrary notwithstanding.

This change in the proposed rate of taxation is eminently proper, and gas companies in the rural districts, where the amount of consumption is small, will not suffer as they would have done if the bill had passed as previously read. While the weaker companies will profit by the change, those establishments supplying our larger towns and cities will likewise experience some benefit, for the amount to be imposed on them has been materially reduced—the highest figure now being twenty cents per thousand cubic feet, when the amount of gas manufactured exceeds 15,000,000 feet per month. The permission accorded to the companies so to increase their charges as to cover this amount will, we hardly think, be used. At all events, in some instances, to take advantage of this provision of the bill would be an extremely impolitic measure, and one fraught with some danger to companies, particularly in certain places where mutterings of discontent have of late years increased, and clamors for reduction in price made. We have not heard the intention of any companies respecting this measure, but venture the conjecture that very few if any advances in price will be made, or any deterioration in the quality of gas be allowed to take place.

Coal oil occupying the next place to gas in the list of illuminating agents, the attention of Congress has been drawn to it as a source of revenue. A change in favor of the producer of this substance has likewise been made, and as regards the crude petroleum the tax of five cents per gallon has been stricken out. On oil distilled wholly from coal, a duty of eight cents per gallon is to be laid. We understand that this concession was obtained through the representations of the members of Congress in whose districts the oil regions are situated, and who are fully alive to the importance of the operations there conducted, and which have in an unprecedently short time grown to such dimensions as to insure the development of a region of country, which under other circumstances would have taken place much more tardily. At present it is hardly possible to estimate the collateral branches of enterprise which have obtained a vigorous growth, stimulated alone by the oil discoveries. In some districts new railroads have been built mainly to convery the oil from the springs. In others, existing roads struggling for their very being have been suddenly strengthened by the demand for transportation facilities, and in some instances where coal and lumber were regarded as the main source of business of these roads, they have been replaced in importance by the vast quantities of oil seeking conveyance to market, and the rolling stock has had to be largely augmented. All this change, it must be remembered, is the growth of but a few months, and so wonderful has this been, and so immeasurably in excess of the most sanguine hopes of operators in oil, that the most extravagant prognostications bid fair to become real. An article on the propable future of the coal oil business will be found in another column, which contains some interesting suggestions relative to European demands. There is no doubt that Europe will become a large customer of our oil raisers, and there is no telling where the demand will stop. We understand that a vessel is now loading at Philadelphia for Liverpool, whose cargo is to consist exclusively of petroleum. Others will doubtless follow, and the trade thus begun will extend over the whole globe. Shipments have been made in large quantities to South America, and Japan has also entered the field as a customer. If commerce may be regarded as the conservator of peace among nations, surely the trade in this article is pre-eminently adapted to subserve those pacific principles, for it is literally "pouring oil upon the waters."

TAPPING OUR MAINS AGAIN.

BROTHER BULL AT HIS OLD TRICKS.

It becomes our painful duty to call the attention of the London *Journal of Gas-Lighting* once more to the fact that the ten commandments are not yet abrogated. Brother B. has again broken the eighth commandment, but he deserves forgiveness for having done it in what he naively calls a "very 'cute way." He is a "'cute old file"—is brother Bull, and it is in this wise that he did it. B. B. exchanges with us. We read his *Journal;* we like it, copy from it, and give him credit for its good things. And he reads our JOURNAL; he likes it, copies from it—sometimes whole pages at a clip—but never gives us credit for a line. He sees his paper thriving under the influence of clippings from our wings; he licks his lips, pockets the shillings, and is *mum*. The last bit of 'cuteness on the part of Brother B., was as follows. The AMERICAN GAS-LIGHT JOURNAL of November 1, 1861, contained an editorial on Coal-Oils. Now, B. B. coveted this article, but as he never mentions this JOURNAL in his own, he set about getting hold of it without seeming to cabbage, and yet without the necessity of giving us the credit of it. So, by hook or by crook, the substance of the article was transferred to the London *Mining Journal*, under a different head, and then the whole thing was transferred to B. B's. *Journal of Gas-Lighting*, as taken from the *Mining Journal*. And here it is:

From the AMERICAN GAS-LIGHT JOURNAL of November 1, 1861, page 136.

EXPLOSIVENESS OF COAL-OILS.

* * * * * * *

Practically speaking, coal-oil consists of a mixture of many hydrocarbons of variable specific gravities, and boiling points ranging all the way from 50° to 600° Fahrenheit.

* * * * * *

In the early stages of the manufacture, cannel coal was almost exclusively used as the oil yielding material, but since the discovery of the oil wells of Pennsylvania and the adjoining States the petroleum raised from them has in a great measure supplanted the use of coal—some establishments using the natural oil alone. The object of this is readily appreciated. The petroleum being naturally in a liquid state, there is no necessity for a preliminary distillation, as in the case when coal is used, in which event the crude oil must be first produced by exposing the coal to distillation at a low heat, and the resulting product be treated in the same manner as the oil ready formed in the wells. By the use of petroleum, the retorts for the first distillation are dispensed with, and thus a saving is effected in apparatus as well as in time and labor. When petroleum alone is used in the manufacture of kerosene oil, the product contains a much larger proportion of volatile hydrocarbons than when coal is wholly or partially employed, and therefore more precautions are necessary, and greater labor is requisite to effectually get rid of these dangerous substances. Some manufacturers not only neglect to remove these volatile compounds from the oils, but actually purchase the light oils from more conscientious refiners, in order to mix them with heavy oils, to make them burn. This is an exceedingly reprehensible practice, and deserving severe punishment; for the heat generated by the heavy oils in burning vaporizes the volatile portion and renders it liable at any time to oxplode.

From the London *Journal of Gas-Lighting* of February 25, 1862, page 128.

PARAFFIN, OR COAL-OILS.

* * * * * * *

These oils are of variable specific gravities, and their boiling points range all the way from 46° to 600° Fahrenheit.

* * * * * * *

In the early stages of this manufacture, cannel coal was almost exclusively used as the oil-yielding material; but, since the discovery of the oil-wells of Pennsylvania, and other places, petroleum has, in a great measure, supplanted the use of coal; some establishments using the natural oil alone. The object of this is readily appreciated. The petroleum being naturally in a liquid state, there is no necessity for a preliminary distillation, as in the case when coal is used; in which event, the crude oil must be first produced by exposing the coal to distillation at a low heat, and the resulting product is treated in the same manner as the oil already formed in the wells. By the use of petroleum, the retorts for the first distillation are dispensed with, and thus a saving is effected apparatus as well as in time and labor.

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The oils distilled wholly from coal, or those with which but a

The oils distilled wholly from coal, or those with which but a small proportion of petroleum has been mingled, are much more easily freed from dangerous portions. By a careful refining, and after distillation, steaming, and a large surface of atmospheric exposure, every dangerous compound can be removed, and no fear need be apprehended from oils which are known to be subjected to a rigid and conscientious refining. In purchasing oils, however, nothing should be taken for granted. They should be carefully tested, and their liability to explode fully investigated. The simplest and most satisfactory test of safety is to place the oil in an open dish in a water-bath, and heat it up to 130° to 140° F. If when elevated to this temperature, on applying a match it does not ignite, it may be pronounced very safe. If it ignites but slowly or sluggishly, it is safe. But any oil which lights quickly in an open dish, at temperatures below 130° F., may be considered as dangerous. We have seen oil, the vapor of which ignited with a smart puff, or explosion, at 60° F., on holding a lighted match more than an inch above its surface. This was dangerous in the highest degree, and the vendor of such a compound should be held to strict accountability for any accident occurring from its being burned in lamps.

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This will do "first rate." We are delighted to be of service to our Brother Bull, "any way he can fix it" as B. B. says, and we are not surprised to find an editor who wouldn't trust the "promises of the Federal Government," ready to "appropriate" Yankee wit to light up his heavy columns.

ANSWERS TO CORRESPONDENTS.

C. J. P., of N. Y.—*We are not aware of boiler iron being now used in the construction of retorts. Mr. King, of Liverpool, England, sometime introduced a retort of this description, which was for a while employed in some gas-works in this country. Perhaps some of our readers have used retorts made in this way.*

Chemicus.—*For preparing oxygen on a large scale, the plan of decomposing sulphuric acid by heat, suggested by Deville, is the cheapest. You will find a paper on this subject on page 42, of Vol. 2.*

A. E. T., of Del.—*You are too late. The prize was secured some time ago. If you had been more on the alert, we doubt not but that you would have been foremost among the competitors.*

D. B. B., of Pa.—*Silicate of soda has been proposed as a lining to petroleum barrels, and we should think would fully answer the purpose of preventing leakage. It would probably require several successive applications of the silicate to effect the result.*

P. B., of Ind.—*Paraffin candles are sold at a much lower figure now than formerly. We have not made an investigation, but have no doubt that tallow, and perhaps adamantine candle stock, are mixed with the paraffine in order to cheapen it. If the candles thus made are sold as pure paraffine, the act of so admixing the ingredients is clearly a fraud. When people want to burn tallow or adamantine candles, they will buy them; but when they ask for paraffin, they want the pure article.*

J. B. F., of Vt.—*It is a disputed point. Experts say from 90 cents to $1.20, varying with different circumstances and local causes.*

D. F. A., of Cal.—*Kurten's work relates only to soaps, and not to candles. An edition was published a few years ago by a Philadelphia house. It is a good, practical work, but the edition we refer to was wretchedly translated, and full of the grossest blunders. Morfit's work is better suited to your purpose.*

H. E. H., of Ohio.—*We differ with you on some minor topics, but in the main your theory is correct. Let us hear from you again when you shall have more fully developed your plans.*

M. W. B., of Mich.—*The experiment was tried, as you correctly infer, under many disadvantageous circumstances, and the wonder is that it worked so well. Another trial will be made ere long, and different results may be expected.*

R. C., Jr., of Mo.—*Graham's Elementary Chemistry is the book for you, and will furnish you all the information you need. Get the English edition, as it is better printed. The notes with which the American editor has interpolated his edition are rather an objection than a recommendation.*

J. H. B., of Ky.—*We think if you once try clay retorts, you will be very averse to adopting anything else. They are endorsed by nearly all the prominent engineers, and are growing in favor every day.*

C. J., of Pa.—*We are aware of the fact. It was brought to our attention some time ago, while making inquiries relative to another subject. Whether the end will justify the means you propose, we are not prepared to say. Our opinion is rather adverse to it.*

CORRESPONDENCE.

THE WATER-GAS.

Boston, April 10th 1862.

To the Editor of the American Gas-Light Journal:

Thinking from the statement in yours of the 1st "that you hear nothing from Marlboro" in regard to the water-gas, I should state the works continue to give the same satisfaction as regards economy, and reliability, as heretofore. The works not having had any trouble since they were started in June last. As to its liability to *condense* by cold, I would state that a three quarter supply to a dwelling-house, has. for fifty feet, been exposed all winter to snow and ice, and has experienced no trouble; the light being equal to any. Some two miles of pipe will be laid this spring by the company, to supply those who wish to have it, but have been unable to.

Yours truly,
J. C. Appleton.

The Sanders Water Gas.—Mr. J. Milton Sanders has addressed a note to the *Scientific American*, denying that the process of making water-gas, according to his patent, is a failure. He says:

"Although the past year has not been very favorable for the progress of any new enterprise, still the water-gas thrived as rapidly as could be expected. The city of Aurora, Indiana, has been lighted with this gas for the last eighteen months, and the town of Marlboro', Mass., for the last six months. During that time, it would be expected that some estimate should be arrived at respecting the cost of the water-gas. As I have not been at either of these towns, I cannot speak from actual observation; but, from letters which I have received from the engineer of those works, the cost and quality of the water-gas have proved highly satisfactory. Mr. Severin, who got up the water gas-works at Aurora, Ind., informs me, in a recent letter, that since they have got to making superheated steam, and crude coal-oil, for the carbonizing of the water constituents, the fact is demonstrated beyond dispute, that the water-gas of a superior quality can be made at a cost as low as twenty-five cents the thousand cubic feet. Mr. Cresson informs us, in his late report of the progress, &c., of coal-gas at the Philadelphia works, that the cost of coal-gas there is $1 20 per thousand feet. As photometric experiments have demonstrated that the water-gas gives one-third more light than ordinary coal-gas, the public will soon have it made clear to them which gas it is for their interest to patronize. Patents for the water-gas have been procured in the principal kingdoms of Europe. A wealthy company have taken hold of the water-gas in London, and a large city near there is now being prepared for lighting with the gas. Mr. Severin, of Aurora, is now on his way to England for the purpose of superintending the erection of the works there. I must also state, that the town of Laconia, New Hampshire, a place containing large manufactories, is now lighted with the water-gas."

Another water-gas patent has been taken out since that of Mr. Sanders—that of Mr. W. H. Gwynne. This gentleman is energetically pushing his invention, and, as we mentioned in our last number, has bought the gas-works at White Plains, N. Y., where he is confident of demonstrating his process a success.

Gas in Scotland.—The price paid for gas in Aberdeen has been reduced from 6s. 6d. to 5s. 10d. per 1,000 cubic feet. No discounts are allowed where the consumption is under 25,000 cubic feet per annum. Above this amount discounts are allowed, varying from 2d. to 1s. 4d. per 1,000 feet. The price paid for gas in the public lamps in Aberdeen is 5¼d. per 100 hours. This is subject to the same discounts as the rate to private consumers. The gas, at Aberdeen, is about 26 candle power, so that the highest price paid is 2.7d. per candle, which is equivalent to 2s. 8d. per 1,000 ft. for 12 candle gas. The burners used in the public lamps are cockspur jets, and the consumption is determined by periodical experiments.

THE NEW RESERVOIR IN THE CENTRAL PARK.

The new receiving reservoir in the Central Park of this city, is now rapidly approaching completion, and is one of the most remarkable works of engineering in America. It is well worthy of a journey from a distance to witness the perfection visible in almost every detail of the work. The name which has been decided upon for this large body of water is *Manhattan Lake*, the appropriateness of which none can question. The work on this important undertaking has been quietly going on for some time, and but few even of those who regularly drive through the Park have been aware of the magnitude of the enterprise, or of the assiduity with which the contractors, Messrs. Fairchild, Walker & Co., have pursued it. The finishing touches will soon be put to the work, and it is expected that all will be in readiness to turn the water in by the middle of May. Those who now take the opportunity of visiting the excavation, will be able to form an adequate idea of its immensity, as the whole structure lays out before the spectator like a map. A late issue of the *Times* thus speaks of the lake in its present and future aspects:

A few hours cannot be more profitably spent than in visiting this artificial *dry lake*, and view the wonders that well-applied capital and labor have accomplished. Here is an artificial basin covering a space of 107 acres, and will contain, when filled, a depth of 38 feet of water—capable of accommodating and floating the entire navy of the United States, even if thrice its present size, and which will contain a sufficient quantity to supply the entire wants of the city with water for thirty or forty days.

The location of this work is admirably selected for the purpose, on the upper portion of the Central Park, and to secure the object intended, the earth and rock has been excavated in some instances to a depth of 40 feet, leaving the bottom nearly level. Around this the embankments are constructed, and also a central one, which divides the reservoir into two sections, but this being a little lower than the sides, the reservoir will, when filled, present to the eye an unbroken surface of water over the entire space.

The inner sides of the reservoir are faced with heavy blocks of stone, laid in a cement of some eight inches in thickness, and filled in behind in the most durable and substantial manner.

The inner stone facing or sides are laid sloping from the bottom, at an angle, we should judge, of about 45 degrees, presenting an appearance of strength and durability calculated to defy not only the elements, but time itself.

As an indication of the great care taken to strengthen the embankments or walls, it may be well to state that the whole is surrounded with a deep or wide belt of clay or concrete puddle, which soon be comes almost as hard as granite itself, and literally binds the whole as with a band of rock. This belt of rock-clay is formed by excavating the earth to the depth of 10 to 40 feet, according to the irregularities of the surface, and 16 feet in width, which is filled with this clayey puddling while in nearly a fluid state, which, as we observed, soon dries and hardens, and will give immense strength to the whole, and resist nearly as much lateral pressure as a wall of stone of equal dimensions. When one looks at the pyramidal walls of this huge basin, this outer structure would seem to be superfluous; but when we reflect upon the fearful consequences to the city that would follow the breaking away of a portion of the main embankment, we most acknowledge that it was most wise, as well as the part of prudence, to thus make all doubly secure, and to insure a sense of perfect security to our population. Thanks to good and practical engineering, we can all now

"Sleep well o' nights,"

without the fear of receiving a *douche* bath some morning before rising from our comfortable beds.

This great work is an additional and most interesting feature of our noble Central Park, and will in a short time become a point of great attraction, not only to our own citizens, but to the curious from every part of the globe who visit the metropolis.

The city itself will, within the lifetime of many who now help to make up this modern Bable, have

extended its crowded limits quite up to the Harlem River, and the inhabitants will overflow its banks like an unrestrained sea into the county of Westchester. But a few years, and we shall see as many coming *down* town to visit the fresh water lake and sport on its artificial banks, as there will be going *up* to view this new wonder of human ingenuity.

But ere this day arives, more reservoirs will be required; more feeders than the single one of the Croton River will be necessary to fill them and supply the rapidly increasing wants of the city; and the descendants of Fairchild, Walker & Co. may perhaps be the successful engineers and contractors to construct the additional works, and thus perpetuate their own as well as their fathers' names to another age and generation.

To-day, even, is not too soon to begin to consider the subject of an additional distributing reservoir. Another is even now required, and should adjoin the present one on Fortieth street, on the plot of ground reserved for that purpose. Let not the iron throats of these great feeders dry up or refuse to yield, from inefficiency, a sufficient supply of the Croton to satisfy our thirsty citizens.

But our object, in this notice, was more particularly to call attention to the Great Receiving Reservoir itself, and to the fact of its near completion.

For more than three years have the contractors been assiduously engaged upon this work, employing, much of the time, more than 2,000 laborers daily. Faithful and untiring, they have earnestly met and overcome obstacles in its progress which few would have effected, and this labor of Hercules will remain for a ages a noble monument to their industry, perseverance, and sagacity, and to their faithfulness and trustworthiness in the execution of their work, as well as to the liberality and foresight of the citizens of New York and their representatives.

GAS LEGISLATION.

In the Pennsylvania Legislature now in session at Harrisburgh, an act has been recently introduced preventing the collection of gas-bills from landlords. The following substitute has been prepared, and will be offered when the previous bill comes up for consideration.

The first section provides that it shall not be lawful for any gas company, or the trustees of such, to collect any gas-bill contracted by any tenant, from the landlord or owner of the premises, "unless the owner or agent of the premises shall have agreed that the flow of gas shall be stopped until the bill is paid." The second section is as follows:

That any tenant or occupant of any house or other premises in front of which the gas-pipes are laid, who is not in arrears to the gas company or trustees for gas already consumed, upon making written application to the gas company, or the trustees thereof, for the introduction of gas into said house or premises, shall be entitled to have the gas introduced into such house or premises, upon giving satisfactory security to the said gas company or the trustees thereof, or upon a prepayment or deposit in money sufficient to pay for the gas to be consumed during three months, and upon subscribing to the regulations of the gas company or trustees, and every gas company which shall neglect or refuse to introduce the gas into any house or premises in front of which gas mains may be laid after such application has been made, unless delayed by municipal regulations, the exigencies of the season or weather, or where capital or other moneys which said company or trustees are authorized to expend in paying the cost of introducing gas-pipes and meters has been previously expended, shall be liable in damages for such neglect or refusal, to be recovered as debts, are now by law recoverable.

Section 3. That it shall not be lawful for any gas company, or the trustees of any gas company, to charge any greater rate or prices for the introduction of mains, screw-pipes, meters, and connections, than are specified in the printed or established schedule of prices of said company.

Section 4. That every gas company, or trustees of any gas company, shall have power, and are hereby authorized to reject or refuse the application for gas, and can stop the use of the same, to all persons who have or shall allow a gas-bill to remain unpaid ten days after the same shall become due. Nothing in this act shall be so construed as to require the gas to be introduced into premises occupied by any person in arrears until all arrearages are liquidated and paid. But every consumer shall be entitled to the supply of gas so long as he shall continue to pay for the same, and comply with the regulations of such company or trustees, and each consumer shall agree to said regulations in writing at the time of his application for gas.

Church Gas-Works.—The handsome new Moravian church in Nazareth, Pa., which was consecrated on the 9th and 10th March last, is lighted with gas made on the premises. The Bethlehem, Pa., *Moravian*, gives the following account of the illumination: Few things astonished the numerous assemblage collected at the church consecration at Nazareth more than to see this new and beautiful house of worship brilliantly lighted up at the night services by gas. It was to many a complete surprise. We had been aware that Mr. B. Lehman, of Bethlehem, had been employed during the course of its construction in laying gas-pipes, but we were led to believe that they were introduced in prospect of the further growth of Nazareth, and with the expectation that at some future time public gas-works would be demanded by the citizens of the place. A small gas factory has however quite recently been put up in an out-building, at the very moderate expense, we are told, of about $400, by the Messrs. Stratton & Brother, of Philadelphia. The gas is manufactured from coal-oil, one gallon of the oil making seventy cubic feet. Two and a half bushels of coke and five hours time are required to fill the holder of 414 feet. On Sunday evening sixty-five burners were lighted from half-past six to half-past nine o'clock, consuming 172 feet, or an average of one foot per hour for each burner, at a pressure of $\frac{4}{4}$ of an inch, and the light gave universal satisfaction.

Manufacture of Coal Gas by Surplus Heat of Blast Ovens and Puddling Furnaces.—Letters patent have been granted to Mr. Thomas Swinnerton, of Dudley Port, blast furnace manager, for "A New or Improved Manufacture of Coal Gas, by the Surplus or Waste Heat of the Blast Ovens and Puddling Furnaces used in the Manufacture of Iron." This invention consists in arranging gas retorts in the blast ovens used for heating the blast of air which is blown into iron smelting furnaces, and also in arranging the said retorts in puddling furnaces used in the manufacture of iron. In carrying it into effect by means of blast ovens, the inventor proceeds as follows: He places the retorts, which are of a cylindrical figure, in a horizontal position in the said ovens, the said retorts lying longitudinally in the said ovens, that is to say, parallel with the fire-bars of the fire-grate of the said ovens. The said retorts are supported upon two or more supports, at a height of about three feet above the fire-bars, and underneath the arch formed by the curved pipes or channels through which the blast to be heated passes. The heat of the blast oven, besides heating the blast pipes, heats the said retorts sufficiently for the purpose of manufacturing coal gas. The retorts are charged with coal, and the gas obtained is purified in the ordinary manner. The gas obtained may be used for lighting the iron works, for heating drying stoves, for the generation of steam, or for any other purpose to which it may be applicable. In carrying this invention into effect by means of puddling furnaces, the retorts are arranged in a manner essentially the same as that described with reference to blast ovens.—*London Colliery Guardian.*

New Method of Casting Iron Pipes.—John Kinniburgh of Lanmarkshire, Scotland, has lately invented and patented a method of casting iron gas and water-pipes, by which all liability to "chill" is removed, and the pipes are much less hard and brittle than when cast in the ordinary way. To accomplish this end, a metallic mould is employed, with a certain composition, whereby the mould may be heated prior to the casting of the melted metal, and the mould then withdrawn from the pipe. If this method be as successful as some have claimed it to be, gas and other engineers will recognize in it a great desideratum.

Gas in England.—We are informed that the London city and other metropolitan gas-light companies are about to have a more formidable opponent in Parliament than they have heretofore had—namely, the City Sewers Commission. It is hoped that the Commission will be well supported by the gas consuming public of the whole of the metropolis, for the protection of their own interests; otherwise the commissioners may restrict themselves to the interests of the city proper, which alone they are called upon to protect.

The Gloucester Gas-light Company have lately enlarged their premises, and are now engaged in the erection of a gas-holder 80 feet in width, 50 feet deep, and capable of storing 250,000 cubic feet of gas, or nearly double the capacity of the storing apparatus now in use. The new holder will be suspended from six iron columns, each weighing 6½ tons, and 56 feet in height. The columns are braced together by girders, 5 feet in height, and weighing 5 tons each. The cost of the improvements and extension will be £10,000.

The Crowle Gas-light and Coke Company have declared a dividend of 9 per cent.

The Worcester Gas-light Company have declared a dividend at the rate of 7 per cent. per annum.

The Newcastle Gas-light Company have declared a dividend for the half-year of 6½ per cent. per annum.

The Collingham Gas-light and Coke Company is reported to be in a very good condition, and a large increase in the number of consumers is announced. The directors recommend a dividend of 6 per cent.

From our excellent contemporary the London *Builder* we learn that at the half-yearly meeting of the Millenhall Gas Company, the usual dividends of 10, 7½, and 5 per cent. were declared, according to the class of shares.

The Wolverhampton Gas Company have declared a dividend of 5 per cent. for the half year. Their report states that the full effect of the reduction in the price of gas from 4s. 2d. to 3s. 9d. per 1,000 cubic feet, had been experienced during the past half year; and that the directors had the satisfaction to report the accuracy of the calculations made previous to their announcing so large a reduction. The results, they add, clearly justified the course they adopted; and proved that with rigid economy in every department of the establishment, they were enabled to sell gas on liberal terms, with due regard to the interests of the proprietors.

Referring to the above statement, the *Builder* says: And so, *we* may add, has it always been where of late years, in consequence of the *Builder's* exertions, liberal reductions, to more and more practicable prices, have been made by the companies; and now every one must be struck with the capital profits gas companies in general have of late years been reaping under their reduced tariffs of prices, although these prices are neither so low in all cases, nor the consequent profits so high, as they might be, and yet will be.

The Cardiff Gas-Light and Coke Company have just held their fiftieth semi-annual meeting, and have declared a dividend of 10 per cent. on their old shares, and 8 per cent. on their new.

Kerosene Oil Explosion in England.—An explosion of a kerosene oil lamp, attended with fatal results, recently occurred in Middlesex, England, by which Mr. J. R. Cotherill, a law writer, was killed. In the evidence given before the coroner, the sister of the deceased stated that the oil contained in the lamp exploded just after she had replenished it, on her brother holding a candle near it to ascertain if enough had been put in. Dr. Harley, Professor of Medical Jurisprudence at University College Hospital, and who had been appointed by the coroner to analyze the oil, said that on exposing it to a temperature of from 90° to 100° F., an explosive vapor was given off. He considered the oil in question very dangerous. Dr. Odling endorsed the testimony of Dr. Harley. The jury pronounced a verdict to the effect that the death of the deceased was caused by burning oil of a dangerous nature, which had been bought as of the best quality. They also advised that legislative interference be invoked to prevent the sale of the dangerous oil—a wise piece of advice, which it would be well if adopted in this country as well as in England.

PATENTS.

UNITED STATES.

34,620.—C. F. Baxter, of Boston, Mass., for Improvement in Filters:

I claim an air chamber so connected with a filter and filtering medium, as to remove the collected impurities of filtration, substantially as described.

34,624.—G. W. Cook and Z. E. B. Nash, of St. Paul, Minnesoto, for Improvement in Pumps:

We claim, first, The Warped flange, a, in combination with the pipe, f, and cylinder, or water chamber, m.

Second, The double-acting slide or swing-valve, b, in combination with the flange, a, and chamber, m.

Third, The extra pipe, g, in combination with the flange, a, and chamber, m, the whole being constructed and operated in the manner and for the purpose described.

34,629.—A. F. Gray, of Belleville, Ill., for Improvement in Water Elevators:

I claim the combination and arrangement of the cylinder, A, with the recoiling plate and arms, B b b, ratched wheel and gudgeon, G, the flat chain, H, the mode of fastening the rope at I, the form of the bail, J, for the attachment of the chain, H, the peculiar shape of the ears or hooks, K k, adapted to the tilting rod, L, and the shape of the tilting rod, and its mode of attachment at M m.

I also claim the plate, N, on the upper edge of the inside wall of the trough, in combination with the bottom of the trough, O, inclining to the corner, P, and the form of the box using the scale which accompanies the drawings as a guide for its proper construction, the whole being constructed, arranged and operating, substantially as described for the purpose set forth.

34,632.—W. H. Gwynne, of Brooklyn, N. Y., for Improved Apparatus for Making Water Gas:

I claim the distributing box, B, with its circulating and heating passage, D, and its perforated cover or top, C, the whole operating substantially as described and shown for the purpose set forth.

34,638.—William Mentzel and Alexander and J. W. Geddes, of Baltimore, Md., for Improvement in Lamps:

We claim the jacket tube, a a a a, as described in combination with the perforated bottom, E E, and outside cap, F, forming an air chamber for regular drafts of heated air through the perforations of the jacket tube, c c, for the supply of oxygen at the point of combustion.

34,641.—Henry Morse, of Natick, Mass., and Dan Perry, of Attleborough, Mass., for Improvement in Water Elevators:

We claim the arrangement and combination of a hoisting chain and a hoisting wheel with openings through its rim, for the escape of the water, substantsally as described.

Second, We claim the construction and arrangement of the hook, K, when hung in the manner and for the purpose, substantially as specified.

34,670.—James Cochrane, of Harburn, Scotland, for Improvement in Wet Gas Meters:

I claim the inclosing of the float of the gas inlet valve in a special chamber or compartment, which is separate and distinct from the main water or measuring chamber of the meter, and the introduction of the lower end of the water supply pipe into such separate chamber, for the purpose described.

34,678.—J. E. Fisk, of Salem, Mass., for Improvement in Dry Gas Meters:

I claim, first, The vertically vibrating rod or rods, I, in combination with the diaphragm or diaphragms of a gas meter, for the purpose set forth.

Second, The detachable gas valve chest, D1, constructed as described, in combination with the diaphragm chambers and the gearing chamber, for the purpose set forth.

Third, The combination with a valve, M, operated substantially as described, of the vibrating rods, I, of the diaphragms, and the connecting arms, K, of the crank shaft, L, for the purpose set forth.

Fourth, The flexible sleeves, J, substantially as and for the purpose set forth.

Fifth, Attaching the diaphragms, C, to the vertically vibrating rod, I, by means of the cross, c, on the end of the rod, and the connecting links, e e e e, in the manner and for the purpose described.

Sixth, The thimble socket, g, and rocking journals, f, of the vibrating rod, for supporting the diaphragms and allowing the rod to vibrate, substantially as described.

34,696.—T. H. Russell, of Northfield, Vt, for Improvement in Water Wheels:

I claim, first, The socket, h', semisphere, i, ring, G, provided with the inclined surfaces, j, and frame, F, provided with the inclined surfaces, k, in combination with the toothed segment, H, and pinion, I, all arranged as shown, for the purpose of raising and lowering the wheel, D, and shaft, E, as set forth.

Second, The packing, C, when applied to the wheel by means of the shoulder, e, of the flanch, b, of the case, A, and the adjustable flanch, B, connected to and arranged with flanch, b, as shown, for the purpose of expanding the packing and fitting it snugly and water tight around the wheel, as described.

Third, The chutes, K, when constructed as shown and arranged relatively with the buckets, h, of the wheel, D, to operate as and for the purpose specified.

Fourth, The arrangement with chute cases, M, of the recesses, O, concentric projections, p p, and radial projections, q, as and for the purpose set forth.

Fifth, The strips or cleats, O, attached to the annular gate, L, in combination with the adjustable ways, P, and friction rollers, c', substantially as and for the purposes set forth.

34,707.—G. E. Van Derburgh, of Mamaroneck, of New York City, for Improved Oil-Proof Cask:

I claim, as a new article of manufacture, a cask, a barrel, a keg, a firkin or other style of vessel, the inner surface of which has been rendered impervious to oil, turpentine, &c., by the single or repeated use of liquid sillicate, substantially as set forth.

34,711.—H. M. Wyeth, of Pulaski, Iowa, for Improvement in Pumps:

I claim the combination and arrangement of the single side valve, e, with the pump box or chamber, A, and discharge pipe, substantially as and for the purposes set forth.

34,733.—Harvey Brown, of New York City, for Improvement in Chimneys for lamps:

I claim the arrangement and construction of a lamp chimney, having a glass bulb for its base, with a sheet-metal tube attached above, substantially in the manner and for the purposes set forth.

Second, I claim the shade for this lamp chimney, constructed and arranged, substantially in the manner and for the purposes set forth.

34,742.—J. D. Custer, of Norristown, Pa., for Improved Lamp Burner:

I claim, first, The bevel lamp wick tube, B, and the mode of folding up the wide wick, or wicks, below the wick shaft, C, substantially as described and shown.

Second, The shade tube, D, and its spring, E, one or both, to be used on my burner or not, as desired, substantially as described.

Third, The regulating cap, F, to be used on my burner or not, as desired, substantially as described and shown.

34,772.—C. W. Pinkham, of Fond du Lac, Wis., for Improved Burning Fluid:

I claim the fluid for illuminating purposes composed of the ingredients substantially in the manner and proportions described and set forth.

34,773.—A. P. Pitkin, of Hartford, Conn., for Improvement in Apparatus for the Manufacture of Illuminating Gas:

I claim, first, Making the front or back plate (one or both) with one or more collars, c, cast or put on to them, cylindrical shape or otherwise, and sufficiently large to admit of the retorts removed when bulged or expanded from use, substantially as described.

Second, I claim making the retorts, d, with one or more flanges or rings, e, cast or put on to them, cylindrical shape or otherwise, and sufficiently large to fill the collars on the plate, a'.

Third, I claim forming an expansion joint for retorts by means of a liquid joint on the condenser or cooler, substantially as shown and described.

34,774.—Henry Port, of New York City, for Improvement in Metallic Molds for Casting Pumps:

I claim, in the manufacture of double-acting pumps, the employment of a metallic mold composed of the plates or sections, z and i, cores, a and b, and the core or outer shell of the mold, d, constructed and arranged substantially as described.

I also claim the slide, m, for the purpose set forth, when used in combination with a metallic mould for casting pumps.

34,782.—James Sangster, of Buffalo, N. Y., for Improvement in Lamps:

I claim the described lamp burners constructed as represented, to wit: With the cone, K, corrugated around its upper aperture, and terminating in points at its lower extremity, the flange, A, and the wick tube, B, provided with gutters at its top and having its edges bent together, as described; the several parts being constructed and arranged together for forming a lamp burner, as is fully set forth.

34,805.—W. H. Matthews, of Chelsea, Mass., assignor to Williams & Co., of Boston, Mass., for Improved Lamp Shade Holder:

I claim the improved shade holder as made with a contractile ring and with its springs provided with jaws, i, so as to operate with such ring and against the paper shade, substantially as described.

I also claim the arrangement and combination of the inner ring with the springs made with the jaws, as described, whereby the said springs and inner ring may be employed to hold the lamp shade to the outer or main ring.

34,810—Abel Brear, of Saugatuck, Conn., for Improved Device for Raising Water by Steam:

I claim the combination of the steam or air pipe, A, the open socket, c, and the delivery pipe, D, with the check valve, F, and the chamber, G, the whole operating substantially as and for the purpose specified.

34,816.—S. G. Clarke, of Cleveland, Ohio, for Improvement in Stills for Coal-Oils:

I claim, first, The described combination of the steam retort, B, with the fire-heat retort, G, arranged and operating as and for the purpose specified.

Second, I claim the described devices for the continuous discharge of the residuum, and the burning of the same, as and for the purpose set forth.

34,819.—G. H. Dodge, of Camden, N. J., for Improvement in Pumps:

First, I claim the upper and lower barrels with the communicating passage, c, the branches, w and m, and foot valve, n, in combination with the hollow plunger, D, and its valve, h, and the hollow plunger, D', and its valve, i, the whole being constructed, arranged and operating as and for the purpose set forth.

Second, The hollow plungers, D and D', with their respective valves, and the packing pieces, f f, when the latter are confined between the two portions of the barrels, as set forth for the purpose specified.

Third, The grooved screw, E, its metal disk or washer, t, and packing washer, s, in combination with the foot valve, n, and the projection, p; the whole being arranged for joint action, substantially as and for the purpose specified.

34,831.—A. J. Gibson, of Worcester, Mass., for Improvement in Burners for Coal-Oil Lamps:

I claim the removable cone, C, provided with the hooks, c c, and arm, D, in combination with the elastic adjustable plates, E F, attached to the arm and arranged in relation with each other, and respectively with the chimney, and burner, A, substantially as and for the purpose set forth.

34,832.—Joel Haag and J. C. Smith, of Bernville, Pa., for Improved Water Wheel:

We claim, first, the employment of the spiral water way contracting in two directions as it approaches the wheel, as and for the purpose set forth.

Second, The use of the buckets being of a concave spiral form gradually diminishing in width from their lower to their upper ends, and having semicircular-formed bottoms and flat tops, so formed that the water is easily and quickly discharged, as and for the purpose specified.

34,839.—J. J. Kimball, of Napierville, Ill., for Improved Water Wheel:

I claim the wheel, D, provided with two sets of buckets, a b, one set, b, being below the bottom of the penstock, A, and the top of the wheel fitted in the bottom of a box, E, in the penstock, in combination with the annular gate, F, placed in the lower part of the wheel encompassing the buckets, b, and connected with the adjusting lever, K, by the rods, f H h, and lever, G, all arranged substantially as and for the purpose set forth.

34,840.—Nathaniel Lloyd and J. D. Dale, of Church, near Accrington, England, for Improvement in Dyeing and Printing with Aniline Colors:

We claim the use of tannin and tartarized or other soluble salt of antimony capable of dilution with water or a soluble salt of lead, mercury or chromium, substantially as described, for the purpose of fixing colors derived from aniline or analogous substances upon textile materials or fabrics.

34,841.—William Morehouse, of Buffalo, N. Y., for Improvement in Lamps for Burning Coal-Oil:

I claim the arrangement and combination of the heater plates, c c, attached to and near the base of the cone, A, with the tube, K, cone, A, burner, B, and globe, i, in the manner and for the purpose set forth.

34,842.—William Morehouse, of Buffalo, N. Y., for Improved Mode of Attaching Chimneys to Lamps:

I claim a lamp chimney or globe, having a part of its base or flanch so reduced in diameter as to permit the chimney or globe to be set upon and secured to or removed from the lamp cap, without causing or requiring a lateral displacement of any of the parts which hold the chimney or the globe to the said cap, substantially as described.

34,857.—G. F. Blake, of Medford, Mass., assignor to himself and Peter Hubbell, of Charlestown, Mass., for Improvement in Water-Meters:

I claim, first, Operating the registering mechanism of a water meter by means of a ratchet wheel, driven directly by the slide valve, substantially as described.

Second, The tappets, i j k l, in combination with the slides, J K, slots, L, and plungers, O O', arranged and operating substantially in the manner set forth.

34,860.—C. E. L. Holmes (assignor to himself and E. D. Griggs), of Waterbury, Conn., for Improved Shade for Lamps:

I claim a paper or cloth shade, A, provided with a reflecting surface, produced by a lining, a, of metallic foil or metal-covered paper or cloth, as and for the purpose specified.

DESIGN.

1,549.—J. J. Marcy (assignor to Edward Miller), of Meriden, Conn., Design for a Lantern.

PETROLEUM IN WAYNE COUNTY, N. Y.—Petroleum has lately been discovered in Wayne County, N. Y., in the town of Savannah. The oil is found floating upon the water in several springs in that locality. It is gathered by the people spreading blankets and and cloths over the water which absorb the oil, and from these it is wrung out. The Clyde *Commercial*, in reference to recent discoveries, says:

The oil was more particularly noticed on Thursday morning by a Mr. Squire and Mr. Taylor's boy; they noticed a something bubbling up through the water, and stopped to examine it. They got some of the oil, and perceiving that it smelt like kerosene they took it home, put it in a lamp and it burned much better than the crude oil of Pennsylvania. The fact is attested by Mr. John Miller of this place, who is largely interested in the oil wells of Pennsylvania, who happened to be here on a visit, and he went down there yesterday. The land on which the oil is being gathered was immediately purchased by Mr. Evans, and many of the lots about there have been sold for larger sums. The farmers for a mile around the spot are excited, and value their farms at double their valuation on Wednesday.

The oil is much purer, in its crude state, than oil from Pennsylvania, and is of a good color; it has got the smell sure enough. None of it has as yet been refined, but it burns well as it is. Those interested can see the oil burning at the store of T. Tipling, corner of Glasgow and Columbia streets.

A large number of folks went down from here yesterday noon to see the thing for themselves; but little is to be seen but a crowd of excited persons gathering the oil, and another crowd looking on. The yield is quite plentiful; one gang of men succeeded in collecting a barrel full in little over an hour. There is considerable excitement and speculation as to the extent of the yield, and the prospects of competing with the Pennsylvania wells.

ANOTHER COLLIERY EXPLOSION.—Another colliery accident has shocked the English people. It occured on the 21st ultimo, at the Cetham Coal Pitt, Merthyr Tudfyl, Wales, and fifty lives were lost—all by an explosion of gas. The explosion must have been most sudden, for five men were found as if at their dinner, and one of the number had actually a piece of bread in his mouth when brought up to the upper earth. Some had evidently received warning of the coming storm of fire, for one was found with his little dog under his arm—both dead—and he was no doubt endeavoring to escape.

THE CANADA OIL WELLS.—The oil wells at Enniskillen, C. W., are yielding more abundantly than was at first described. There are about 200 wells at that place, which average 5,000 barrels a day. Out of one well 40 gallons were pumped in two minutes. Another well yields a barrel in 30 seconds, or nearly 3,000 barrels a day. Enniskillen is 20 feet above the level of Lake Huron, and 600 feet above the level of the sea. The rock is a little over 40 feet below the surface of the earth, and the wells vary in depth from 100 to 230 feet, or from 50 to 180 feet below the rock. Vessels and transportation fail to meet the increasing supply of oil, and much of it is wasted. Eighteen months ago the oil district was a wilderness; it now contains 600 inhabitants, and the number is increasing. The price at the wells is $1 per barrel, and the empty barrels sell t $2 each.

A CROWN OF LIGHT.—The French Empress, it is said, is having a coronet manufactured for her, "to be composed of glass globules, illuminated by an electric light, ruled by a conductor encircling the head;" but where the electricity is to be generated does not appear: perhaps in the crinoline. We have sometimes thought, in our dreaming moments, that a time might come when hidden apparatus might be attached in small compass to the person in such a way as to constitute both a defensive and an offensive instrument, contributing shocks like the electric eel and thus astonishing the evil disposed by something like preternatural blows. If there be any truth in the luminous coronet of the Empress, she appears to be taking the first step towards causing our dream to "come true."—*London Builder.*

A RAILWAY TO THE OIL WELLS.—The directors of the Great Western Railway have instructed their chief engineer to make a survey of the best line from the Sarnia branch, to the centre of the oil wells on Bear Creek, in the township of Enniskillen. It is intended that the branch shall be in working order in the course of the coming summer. The whole question of traffic rates for transportation of the oil, will then undergo thorough examination, and every encouragement be given for the development of the trade, consistent with a fair return for the investment of the company. This will be good news for our friends in Enniskillen.

This is an evidence of the important part the oil traffic will play in the statistical returns of Canadian enterprise. Petroleum now bids fair to become one of the staple productions of that country, and to open up avenues of industry which, a few years ago, none would have dreamed of.

A FISH A WITNESS IN A COURT OF JUSTICE.—A singular incident occurred at the Stafford Assizes, last Tuesday, in the cause of "*Timmins v. The Birmingham and Staffordshire Gas Company,*" in which the plaintiff sued the gas company for damages caused by them in allowing the "tank gas-water," from their gasometer, to flow into the plaintiff's well. Dr. Letheby, the analytical chemist, and officer of health in the city of London, being engaged as one of the scientific witnesses on the part of the gas company, sought to prove that gas-water could not have entered the plaintiff's well, because he found animalculæ in the water. Mr. W. M. Williams and Mr. Bird, the chemical witnesses for the plaintiff, suspecting that the learned doctor would advance the theory that animal life cannot exist in water tainted with gas, determined to give it a flat contradiction by producing in court a live fish, swimming in a mixture of half an ounce of the gas tank-water with 25 ounces of pure water, having about the smell and taste of the water in plaintiff's well. Accordingly, a fine healthy gudgeon was caught in the river at Stafford, put into a basin, the basin filled with the above mixture, and slipped under a seat in court, ready for the doctor, should he advance his theory, which, upon his examination, he soon did, asserting, most positively, that the least taint of gas in water would destroy animal life, when, to his evident surprise, and amid a general roar of laughter, in which the learned judge heartily joined, the basin, with the fish swimming in it, was lifted up and placed in the centre of the table full in view of both judge and jury, and proving, by his healthy movements, that though the water was not agreeable, animal life was still possible in it. When the trial was over, the fish was taken back to the river and returned to his "native element," apparently none the worse for his short visit as a witness to Stafford Assizes.—*Journal of Gas-Lighting.*

PETROLEUM ITEMS.—Our exchanges, particularly those from the oil regions, come to us laden with items respecting new oil wells, and still more wonderful discoveries of oleaginous deposits, than those previously announced. Among these remarkable narrations, we clip the following from the *Canada Free Press*, of March 28th, announcing the discovery of another great oil spring. The *Press*, says: All oil springs hitherto struck, sink into insignificence when compared with that which burst up on Saturday night at the Oil Springs. Suddenly the oil boiled out of the ground, and flew up to a height of thirty feet, continuing with unabated vigor, discharging ten barrels of oil per minute! This wonderful spring belongs to Black & Matthewson.

ENNISKILLEN, C. W.—A NEW OIL CITY.—A correspondent of one of the Cannadian papers, speaking of the great flowing oil well at Enniskillen, says:

"In one of my former letters I mentioned we were in a quandary—that we wanted a name for the place; since then a number of those inhabitants having an interest here, and a desire to have the ultimate name fixed, have met together, and, after numerous suggestions, have decided that Olicia shall be the name by which the place shall be known. It is derived from the Latin, *olicius—oily—full of oil.* It appears appropriate and expressive. I have dated my letter as from Olicia."

If all new settlements were named from some local association, we would not be troubled with such an endless repetition of Romes, Carthages, Athens, &c., as now render geographical distinctions in the United States so perplexing, not only to foreigners, but also to those who are to the manor born. There is something in an appropriate name after all, Shakspeare's famous apothegm to the contrary notwithstanding.

PHILADELPHIA, PA.—A meeting of the trustees of the Philadelphia Gas-works was held on 31st ult., at which it was resolved, that after the first of July next a reduction of one-ninth of the face amount of bills, made out at $2 25 per thousand cubic feet consumed, should be allowed on bills paid within five days after the expiration of the quarter paid for. The present price is $2 25 per thousand cubic feet, with a discount of five per cent. when the bill paid is paid within five days after the expiration of a quarter, which is equal to 11¼ cents, making the net cost $2 13¾ cents. The arrangement to be followed after the first of July, will make the net cost of the gas $2 per thousand cubic feet.

GAS EXPLOSION IN ENGLAND.—On the morning of March 6th, an explosion of gas occurred in the house of Mr. Wilson, Church street, Wigan, England. Mrs. Wilson, on entering the house, struck a match to light the gas, when a terrific explosion took place. Mrs. Wilson's clothes were immediately set on fire, and the house was damaged by the flames to a considerable extent. The force of the explosion made a complete wreck of the house, the ceilings being lifted and the doors and windows blown out. The explosion is attributed to the gas having escaped from a water-slide chandelier. Mrs. Wilson, although severely burned, is in a fair way of recovery.

STERLING COAL.—We refer again to the advertisement of F. Butts & Co. in this number.

PORTABLE GAS-WORKS.

STRATTON & BROTHER'S PATENT GAS-WORKS, for making Gas from ROSIN or COAL OILS. STRATTON'S Patent Double Retort, for Coal, Wood, or Rosin.

Our Patent Gas Works have been put up in some forty Country Residences, Factories, Churches, &c., in which an experience of *ten years* gives entire satisfaction.

Water Works also put up in country residences. All work warranted.

Reference—Prof. JAS. C. BOOTH, U.S. Mint, Phila.
CHRISTOPHER FALLON, "
STRATTON & BROTHER,
719 Walnut street, Philadelphia.

BUTLER'S PATENT PORTABLE ROSIN GAS-WORKS,
FOR
Dwellings, Churches, Country Villages,
As well as for Consumers in Large Cities.
JOHN BUTLER,
No. 112 Fulton st. and 15 Henry st.,
Brooklyn, N. Y.

FOR LIGHTING RAILROAD CARS AND STEAMBOATS
WITH GAS.
The whole process of Filling the Gas-Holders of a Railway Train, requires but Three Minutes.
Apply to the
NEW YORK CAR & STEAMBOAT GAS. CO.,
No. 117 Fulton st., N. Y.

C. R. WOODWORTH, Manufacturer of
PORTABLE GAS WORKS,
74 WALL STREET, NEW YORK CITY.

HOT WATER GAS STOVES, Manufactured by HUNTER, KELLER & Co., 144 Centre street, New York.
See Engravings on page 163, Vol. II. of this JOURNAL.

UNION WIRE-WORKS.

ROBERT McMURRAY & CO., No. 29 Fulton Street, New York, Manufacturers of Copper, Brass, and Iron Wire Cloth for Gas Works, all kinds of Foundry Riddles, Sieves, and Screens. Improved Wire Window Shades, Wire Bolting Cloth, Duster-Wire, Wire Cloth for fanning machines, Rosin, &c., Locomotive Wire, Fire Guards, Ornamental Wire Work of every description. Patent Improved Wove and Laid made Dandy Rolls repaired and designed to order.

GAS-HOLDERS.

GASOMETERS, RETORT-HOUSE ROOFS, WATER-TANKS,
PURIFYING-BOXES, COAL-CARS, COKE BARROWS,
AND ALL KINDS OF
WROUGHT-IRON WORK FOR GAS AND WATER WORKS.
Manufactured by GEORGE W. KRAFT, Chestnut street wharf, West Philadelphia, Pa.

POOLE & HUNT, BALTIMORE, MD., are prepared to execute orders for
GAS-HOLDERS,
IRON-ROOF FRAMING,
And all other descriptions of
Iron Work for Gas-Works, Water-Pipes, and Heavy Castings, and Machinery generally.

DRAIN-PIPE.

DRAIN PIPES, ENGLISH AND AMERICAN.
Garnkirk Chimney Tops,
Plumbers' Materials,
Minton's Encaustic Tiles.
For Sale by
MILLER & COATES,
279 Pearl st., New York.

ANALYTICAL CHEMIST.

C. ELTON BUCK, ANALYTICAL and Consulting Chemist, 39 Nassau st., New York. Analyses of Ores, Minerals, Soils, Guanos, Coals, &c., and Tests of Commercial Articles, carefully and promptly made. Consultations may be had, and opinions given on Chemical questions. Samples for analysis from a distance, may be sent by mail or express, directed to the Laboratory as above.

"NEW BOOKS." ANY OF OUR Readers who may require books on the subject of Gas-Light, Heat, Water, Sewerage, or other scientific matters, can be promptly supplied by addressing the Publisher of The AMERICAN GAS-LIGHT JOURNAL, No. 58 Liberty st., New York.

HEATING APPARATUS.

JOSEPH NASON & CO., Constructors of Apparatus for Warming Public and Private Buildings by Steam and Hot Water.
Improved Fans for Ventilating Hospitals and other Public Buildings.
JOSEPH NASON,
HENRY R. WORTHINGTON,
No. 61 Beekman street, corner of Gold street, New York.

MISCELLANEOUS.

HARRIS LOUDERBACK, FIRE-BRICK LAYER
AND GAS RETORT SETTER,
No. 1005 Clement Street, Philadelphia.

GAS THERMOMETERS FOR ascertaining and regulating the temperature of the gas while passing through the purifiers into the station meters. For sale at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

WANTED.

GAS-WORKS WANTED TO LEASE.
The advertiser wishes to lease a Gas-Works, of at least two benches of retorts, situated within one hundred miles of New York city. A fair rent will be paid, and the best security given.
Address "Lessee," at Office of AMERICAN GAS-LIGHT JOURNAL, No. 39 Nassau street, New York, stating location and terms.

A PRACTICAL AND EXPERIENced Gas-Fitter, with first rate recommendations, wishes employment in City or Country. Address X. Y. Z., Office of The AMERICAN GAS-LIGHT JOURNAL.

GASOMETER RIVETS.

PHILLIPS & ALLEN, Pennsylvania Avenue, above 22d street, Philadelphia.—GASOMETER RIVETS of all kinds.

STOP-COCKS, &C.,

DANIEL THOMPSON, Machinist and Manufacturer of Stop-Cocks, Fire-Plugs, &c., for Water-Works, Stop-Cocks, Valves, Drip Pumps, &c. for Gas-Works, No. 133 Elfreth Alley, Philadelphia.

GLENDON COAL-OIL COMPANY of Boston, Massachusetts, incorporated June 1, 1859.
E. F. JONES & CO., Agents,
3 Kilby st., cor. Central, Boston, Mass.

THE
STERLING GAS-REGULATOR,
Improves the Light and Saves a Large Per Centage of Gas.

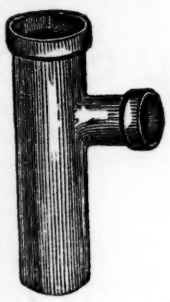
MANUFACTURED BY THE
WHEELER & WILSON SEWING MACHINE COMPANY.

It is well known that Printers require the best and most brilliant light In proof of the superiority of these Machines over all others, the following New York establishments are using them, and testify to their excellence:—New York Times, New York Herald, New York World, New York Tribune, New York Sun, Journal of Commerce, Courier & Enquirer, Evening Post, The Zietung, Dispatch, Leader, Scientific American, Advertiser and Spectator, Independent, Daily News, Harper's Monthly and Weekly, Transcript, Mercury, Atlas, Life Illustrated, Albion, Spirit of the Times, AMERICAN GAS-LIGHT JOURNAL, Christian Enquirer, Churchman, Church Journal, Christian Advocate, Christian Ambassador, Christian Intelligencer, Observer, Sunday Times, Sunday Courier.

By order of the New York and Brooklyn Common Councils, these Regulators are now used in the City Halls, Police Stations, Markets, and other Public Buildings in both cities.

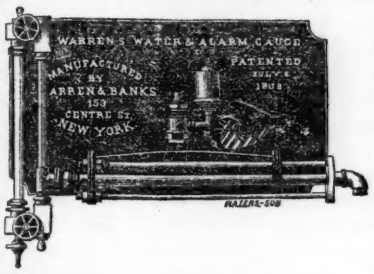
They are Warranted by the
WHEELER & WILSON SEWING-MACHINE CO.,
505 BROADWAY, NEW YORK,

To keep in order, and always maintain the pressurs of the Gas at the lowest point for a brilliant light and economical combustion. They are so constructed that *under no circumstances can the Mercury get into the Meters, or in any way injure them.*



GAS, STEAM, SMOKE,
PURE WATER & SOIL PIPE,
FROM
JOSEPH CLIFF
Wortley Fire-Brick Works, Leeds, England.
T. W. PARMELE, Agt.,
No. 4 Irving Place, N. Y.

WARREN'S PATENT WATER & ALARM GAUGE
For Protecting the Flues and Preventing Steam-Boiler Explosions.



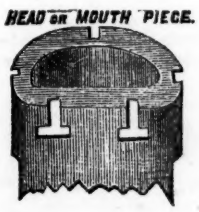
This is a reliable High and Low Water Detector, arranged so as to render it one of the best Water Gauges ever attached to a Steam-Boiler; always presenting before the Engineer at sight the exact height of the water, and if, by oversight or by sudden leakage, the water gets low in the boiler, it will cause an alarm before the water gets below the flues, thereby preventing an explosion. This Gauge can be made to alarm at any point desired as a High Water Detector, thereby preventing the water from getting to that height as to be forced into the cylinder of the engine, often causing serious accidents. Thus it is a High as well as a Low water Detector. For sale by
WARREN & BANKS,
153 Centre st., corner of Canal st., New York,
Where a Gauge is constantly in operation.

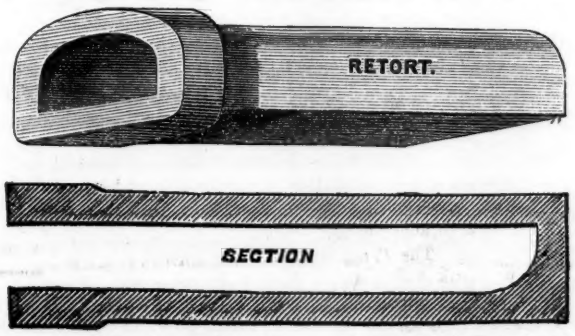
JOHN RUSSELL & CO.,
PATENT TUBE MAKERS,
THE OLD TUBE WORKS, WEDNESBURY, AND THE ALMA WORKS, WALSAL, STAFFORDSHIRE,
69 UPPER THAMES ST., & 5 CHARLES ST., SOHO, LONDON;
AND 35 GRANBY ROW, MANCHESTER, ENGLAND.

The original Manufacturers of WROUGHT-IRON GAS TUBES, and the Inventors of the Lap-welded Tubes for Locomotive and Marine Boilers. All kinds of TUBES and FITTINGS, whether for Gas, Steam, or Water. Galvanized and Composition Tubes. Chandeliers, and every kind of Brass work for Gas and Steam.

STOCKS, DIES, AND TAPS OF ALL SIZES. CAST-IRON PIPE AND GAS-METERS.
All Goods Warranted.

KING BROTHERS,
STOURBRIDGE, ENGLAND, FIRE-BRICK AND RETORT WORKS.





KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them

Free from Cracks and Correct in Form.

By great care in Manufacturing, combined with the advantages in Burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

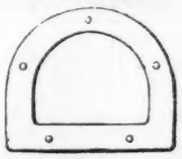
RETORT OVENS, FIRE-BRICKS, GUARDS, SADDLES, RABITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

EVERY RETORT AND BRICK IS BRANDED "KING BROTHERS, STOURBRIDGE."

Apply to E. W. BARSTOW, 83 Maiden Lane, New York, where samples can be seen.

HARRIS & PEARSON,
PROPRIETORS OF
Best Glass-House Pot & Crucible Clay.
Manufacturers of Fire-Bricks, Gas-Retorts, and Glass-House Furnace-Bricks of every description.
AMBLECOTE FIRE-CLAY AND BRICK WORKS, STOURBRIDGE, ENGLAND.

COWEN'S PATENT FIRE-CLAY RETORTS.



JOSEPH COWEN & CO.,
BLAYDON BURN, near Newcastle-on-Tyne, England,

Have always been, and are still, the most extensive manufacturers of FIRE-CLAY RETORTS in the United Kingdom, and were the only parties to whom a Prize Medal was awarded at the Great Exhibition, in London, 1851, for

"GAS RETORTS, AND OTHER OBJECTS IN FIRE-CLAY."

J. C. & CO. make Fire-Clay Retorts of all shapes and dimensions, and to fit existing mouth-pieces.

Orders for FIRE-CLAY RETORTS, TILES, BEARERS, and other articles in Fire-Clay, receive immediate attention, and are promptly executed at their Works, as above. Drawings of Settings adapted for Cowen's Patent Fire-Clay Retorts supplied.

AGENTS, MESSRS. MEAD & BELL,
13 CLIFF STREET, NEW YORK,

N. B.—J. C. & CO.'S RETORTS are well adapted for small Gas-Works, as they can be used without an Exhauster.

By Her Majesty's Royal Letters Patent.

PATENT BITUMINIZED PIPES,

For the Conveyance of Water, Gas, and Drainage.

OFFICES: 14A CANNON STREET, LONDON, C.E.

FREDERICK W. BOND, Sole Agent, No. 58 Liberty Street, near Broadway, New York.

This important invention, patented by Mr. Charles Newbold, and now for the first time introduced to the notice of the British and American public, may confidently be stated to be one of the greatest interest and commercial value, as the Patent Bituminized Pipes possess all the qualities necessary for the conveyance of Water, Gas, Sewage, Mine-Pumps, &c., viz.: great strength, great durability, and inoxidability, with the immense advantage of being about *one fifth* the weight of iron pipes, and about 35 per cent. cheaper; whilst, compared with lead pipes, the Bituminized Pipes are only about *one fourth* their price, without the possibility of the formation of the oxide and carbonate of lead, so dangerous for every purpose. They will stand 150 degrees of Heat, and after many trials it has been satisfactorily proved that rats or vermin will not touch them. They also withstand the action of all acids and salts.

Iron pipes are at present frequently covered with a coating of bitumen or coal tar before they are laid down; but the adherence of this coating to the metal being very imperfect, on account of vibration and the difference of expansion, this preservation is insufficient, besides being exposed to a number of influences which neutralize its efficacy—galvanic currents materially assist the formation of oxides and deposits, which cause the obstruction and eventually the destruction of metallic pipes.

The Patent Bituminized Pipes are neutral, non-conductors of electricity, and consequently are not exposed to any of the deteriorating influences mentioned above. The process of manufacture of these Pipes consist in causing a roll of paper to pass through a reservoir of melted bitumen, after which it is tightly coiled around a mandril to any required thickness; and thus, when hardened, a tube is formed of perfect texture, great hardness, and enormous strength. These Pipes are proved, by hydraulic pressure, to resist a pressure of 220 lbs. to the square inch, equal to 506 feet head of water, which is more than double the altitude of the highest reservoir in London. The bituminous composition which unites and covers these Pipes is so well known as an excellent preservative, that it will be unnecessary to demonstrate that, when laid underground, the durability of the Patent Bituminized Pipes may be considered as unlimited. The Pipes are made in lengths of seven feet, and are connected by socket joints of the same material as the Pipes; or they can be fitted with iron flanged sockets, screwed together in a most simple and inexpensive manner.

For Gas these Pipes are invaluable; the Gas-lining which we insert effectualy resists the action of Gas, and being non-conductors, there can be no condensation in them, and the joints made with the Patent Cement are so strong as to entirely prevent Leakage.

The cost of laying the Pipe is also small, compared with those of iron, and can be done by mere laborers. Although only now introduced into England, the Bituminized Pipes have been in use on the Continent during the last three years, and those which have been employed in Paris for the conveyance of gas have been ascertained to be as perfect now as when first laid down.

DIRECTIONS FOR JOINING THE PATENT BITUMINIZED PIPES.

Pack the pipes level in the ordinary way; slip the collar over one of the pipes; draw the ends close together and warm them by putting a hot iron between them; then press them together so as to make them adhere; take a piece of iron wire netting, about half an inch in the mesh, a little narrower than the length of the collar, and long enough to wrap once round the pipe, spread the collar over it and the joining; close the ends with clay; pour the melted cement into the manhole of the collar, and fill up the interior space; then remove the clay and the joint is finished.

It is necessary to leave a small vent hole in the clay at each end of the collar to allow the air to escape as the cement is poured in, that there may be no flaws or air bubles in it when cold. If in cooling the cement settles in the manhole, fill up again.

N. B.—The cement should be broken into small pieces and melted in a pot as you do lead, at a low temperature, until it is dissolved; it must be stirred while melting; then take it off and keep stiring it as it cools until it becomes nearly as liquid as water; then pour quickly.

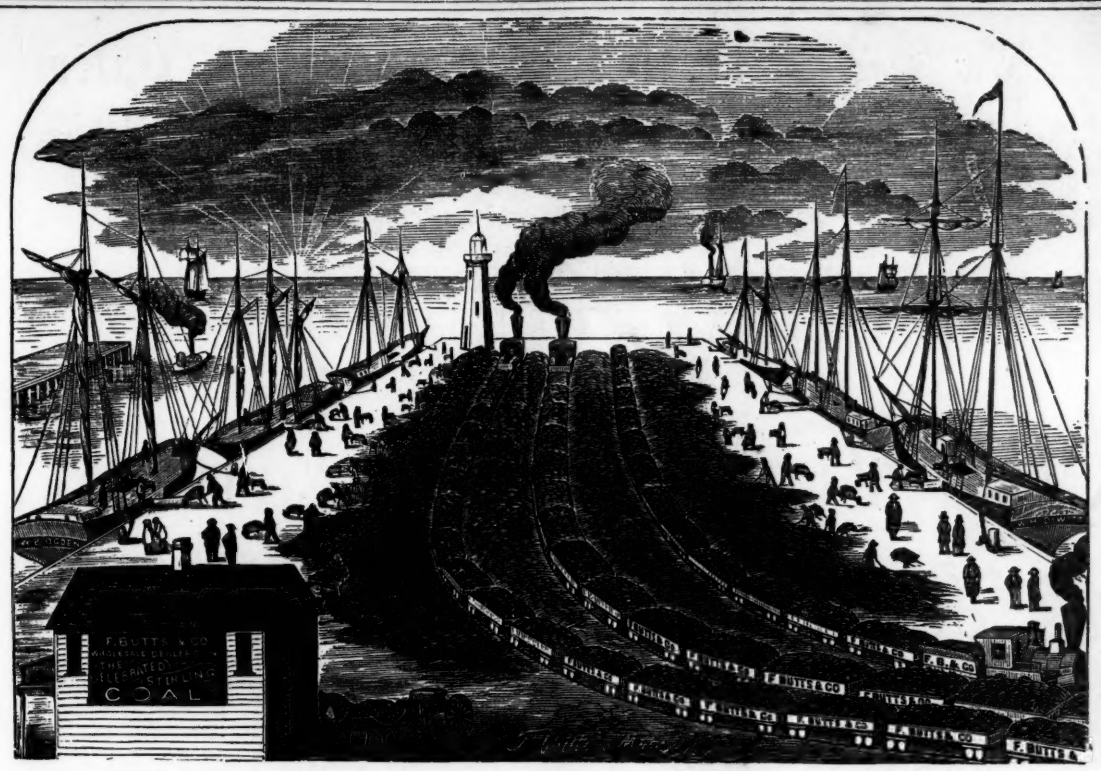
All Orders should be addressed to the

Patent Bituminized Water, Gas, and Drainage Pipe Company, Limited,
14A Cannon Street, London, C.E.,
ALEXANDER YOUNG,
Managing Director;
or to FREDERICK W. BOND,
Sole Agent, 58 Liberty Street,
(Between Broadway and Nassau Streets,)
NEW YORK.

SCALE OF PRICES, delivered on board ship, at LONDON.

Inside Diameter.....	2-in.	3-in.	4-in.	5-in.	6-in.	7-in.	8-in.	9-in.	10-in.	12-in.	16-in.	20-in.	24-in.	30-in.	36-in.
Price per Foot, including Collars..	s. d. 0 4	s. d. 0 6	s. d. 0 8	s. d. 0 11	s. d. 1 2	s. d. 1 5	s. d. 1 8	s. d. 2 0	s. d. 2 4	s. d. 2 8	s. d. 4 2	s. d. 6 0	s. d. 8 6	s. d. 11 0	s. d. 13 0

Cement for Joining, For Sale as above.



(View of F. Butts & Co.'s Coal Pier, Cleveland, O., on the Government and Cleveland & Pittsburgh R.R. Piers at the mouth of the Cuyahoga River, Lake Erie.)

F. BUTTS & CO.,

(Successors to BUTTS & KENDALL,)

DEALERS IN THE CELEBRATED

STERLING COAL!

PITTSBURGH, AND OTHER GAS COALS,

CLEVELAND, OHIO.

DEAR SIR:—We beg leave to call your attention to the following, from which, and others, (and the universal expression of Gas men, as to the superior quality of Sterling Coal,) we believe that it is the best Gas Coal in the country.

From the MANHATTAN GAS LIGHT CO., New York.

Gentlemen:—Yours of the 9th inst. is received. The "Sterling Coal" received from you during the past year worked very satisfactorily—averaging 9,520 cubic feet of 15 candle Gas per ton of 2,240 lbs., and 41 bushels of Coke weighing 1,465 lbs.

We consider it among the best of American Gas Coals, for the quantity and quality of the Gas produced, and also for the excellent quality of its Coke.

I am Gentlemen, Your Obedient Servant, CHARLES ROOME, President.

From the OGDENSBURGH GAS CO., Ogdensburgh, N. Y.

January 6, 1862.

Messrs. F. Butts & Co.—This Company has used your Sterling Coal since July, 1860. We consider it the best Coal we have ever used; gives us larger yields of Gas, requires less lime, and makes a superior Coke. Respectfully, Yours, R. E. GORDON, Sup't Og. Gas Works.

From the RONDOUT AND KINGSTON GAS LIGHT CO., Rondout, N. Y.

January 10, 1860.

Messrs. F. Butts & Co.—Gentlemen:—This Company have used your Coal nearly two years. It is in every respect satisfactory, and to it is given the preference over all other coals. Its average yield is 4 40.100. The light clear and strong. The Gas is easily purified and quite free from sulphur. The yield of Coke is large and of superior quality. It is, in my opinion, equal to any Gas Coal in the market. Very Respectfully, WM. W. HAGUE, Sup't.

From the SANDUSKY GAS CO., Sandusky, O.

January 6, 1862.

Messrs. F. Butts & Co., Cleveland.—Gentlemen:—We have used your Sterling Coal for two years and six months past, and find it superior in quality and all that a number one Gas Coal can be. The illuminating power of the Gas is high, the Coke is of a superior quality, and in many instances our monthly average product has been 4 40.100 per one lb. Coal. It gives us entire satisfaction. I am, Gentlemen, Yours, Respectfully, WILLIAM HUDSON, Sup't and Sec'y.

From the TOLEDO GAS LIGHT CO., Toledo, O.

Gents:—Your favor of the 28th inst. to hand and noted.

The Sterling Coal received from Messrs. Butts & Co., the last summer and fall, fully sustains the character it has as a Gas Coal, from previous use in our works. We think the quality of Gas is very good, a little better than that produced from the Coal had of them the year previous—yielding 8,666 feet per ton of 2,000 lbs., and 36 bushels of Coke of very good quality, well adapted to our use.

Respectfully, Yours, GEO. SPENCER, President.

From the BUFFALO GAS LIGHT CO., Buffalo, N. Y.

Messrs. F. Butts & Co.—The Sterling Coal we have had from you we find to be an excellent Gas Coal. The yield of both Gas and Coke is good. The illuminating power of the Gas is high and the quality of the Coke is very good. ROBERT ROBSON, Foreman Gas Works.

From the CLEVELAND GAS LIGHT & COKE CO., Cleveland, O.

Gentlemen:—This Company has used between 3,000 and 4,000 tons of your "Sterling Coal," and are still using it with very satisfactory results. We find the average product of a ton of 2,000 lbs. is about 8,800 feet of Gas, and about 37 bushels of Coke. The Gas is of good illuminating power and quite free from sulphur or other impurities, one bushel of lime purifying 9,000 feet, and the Coke of vesy superior quality.

The yield of Gas is about the same as from the Pittsburgh Coal, and the Coke is better adapted to our use. Yours, Truly.

T. DWIGHT EELLS, Secretary.

From the ALBANY GAS LIGHT CO. Albany, N. Y.

Messrs. F. Butts & Co.—Gentlemen:—We have been using your "Sterling Coal" at these works for two years, finding it all that is important in Gas-making Coal, as respect yield and quality of Gas, and freedom from sulphur—as much so as any of the Coaking Coal in use. We are disposed to contract for a further supply of the same quality.

Very Respectfully, PAUL A. SABBATON, Sup't.

From the TROY GAS LIGHT CO., Troy, N. Y.

Messrs. F. Butts & Co.—Gentlemen:—The Coal we have used for the past year at our works has been mostly "Sterling." It has given us full satisfaction in every respect.

S. S. DAUCHY, Sup't.

The following analysis of "Sterling Coal" was made by Prof. J. LANG CASSELS, Professor in the Cleveland Medical College, who stands at the head of his profession as a chemist, and any statement made by him can be relied upon with safety.

Sp. gr	1,288
Eygremaeric Moisture	1.85
Volative Combustible Matters	34.15
Coke (clear and porous)	64.00
	100
Fixed Carbon in the Coke	62.00
Ashes (yellowish white)	2.00
	64.00

COMPOSITION OF ASHES.

Silex	0.80
Alumini	0.45
Sulphate of Iron	0.75
	2.00
Per centage of Sulphur	0.23

J. LANG CASSELS, M. D.,
Prof. of Chemistry, Clev. Med. Col.

P. S.—The specimen from which the above analysis was made was taken by myself from a car load, and may be regarded as a fair average; in fact, this coal is very uniform in its characteristics. It also yielded 4 per cent. more gas than the Pittsburgh Coal. J. L. C.

We would also refer to Gas Companies in the following places:

NEW YORK CITY (Manhattan and New York Co.'s), BROOKLYN, ALBANY, TROY, WEST TROY, ROCHESTER, OSWEGO, OGDENSBURGH, LANSINGBURGH, NEWBURGH, ROME, PALMYRA, GENEVA, YONKERS, RONDOUT, KINGSTON, ALBION, BROCKPORT, SENECA FALLS, ELMIRA and LYONS, in State of New York; CLEVELAND, TOLEDO, SANDUSKY, NORWALK, OBERLIN, SALEM and FREMONT, in Ohio; DETROIT, ANN ARBOR, GRAND RAPIDS, KALAMAZOO, JACKSON and ADRIAN, in Michigan; COBURG, in Canada; CHICAGO, Ill., and two Companies in MILWAUKEE, Wisconsin.

STERLING COAL MINES, situated in Pennsylvania, are wholly under our control; the coal mined and sold only by us or our agents. (Agents in every instance having authority over our signature.)

Five years experience in Mining, Sale and use of Sterling Coal, gives us full confidence in asserting there is no Coal that combines all the requisites so largely for a Gas or Smithing Coal as this.

This year we are several hundred yards further in the Mine than last season, and feel assured Sterling Coal will more than sustain the high reputation it has heretofore gained.

Our facilities largely increased for MINING AND SHIPPING, we are prepared to supply the great demand for this Coal on a much more extensive scale.

Not being dependent upon high water for transportation, but receiving our Coal by RAIL, we are at all times prepared to fill orders, and ready to contract for delivery of the Celebrated Sterling Coal, on board Vessel or Cars at Cleveland, or at works of Gas Light Co's, in any of the Northern States or Canada.

CLEVELAND, *January* 15, 1862. Address— **F. BUTTS & CO., Drawer 74, Cleveland, O.**

MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS.

MANUFACTORIES

SUFFOLK ST. CLERKENWELL GREEN. & ALLEN ST. GOSWELL ST. LONDON.

BOSTON, Mass., 1 Barrett Street,—August 2, 1860.

RICHARD GLOVER

BEGS TO INFORM

GAS COMPANIES AND CONTRACTORS

THAT HE HAS ALWAYS ON HAND A LARGE ASSORTMENT OF

THOMAS GLOVER'S (of London) CELEBRATED

DRY GAS METERS.

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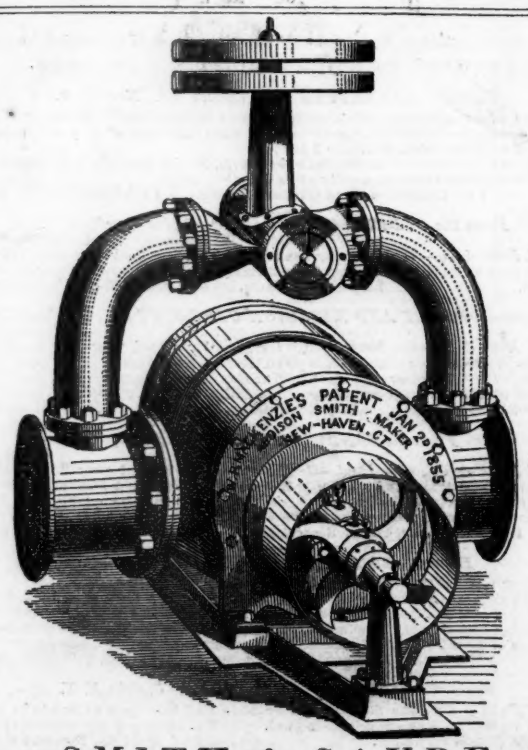

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